PAMS Technical Documentation
NSM–5 Series Transceivers

Service Software Instructions

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Service Software

General

To run the Service Software, a parallel port software protection device (PKD–1) has to be connected. TDF–4 box must connected to PC for flashing purposes. The test functions send test messages from PC to mobile stations (MS) and receive results and show them in the PC display. The messages can be sent via M2BUS or FBUS.

Note: if this software is to be run on laptops, the power saving feature MUST be switched off.

Hardware requirements for Windows 3.11

The recommended minimum hardware standard to run Service Software is any computer which is 386 33 MHz or greater with at least 4 MB of memory and VGA type display (640 x 480). This assumes that only the WinTesla with phone module is active, i.e. other Windows packages are not running in the background.

Hardware requirements for Windows 95, 98 & NT

The recommended minimum hardware standard to run Service Software is any computer which has Pentium processor and meets HW requirements recommended by Microsoft.

Software Environment of the Support Modules

The Service Software user interface is intended for the following environments: Microsoft Windows 3.11 (enhanced mode), Windows 95, 98 and NT.

As an ordinary Windows application, the main idea in the user interface is that selections are made with menus, push buttons and shortcut keys. Selections can be done by using keyboard and/or mouse. There is always a status bar displayed at the bottom of the main window which contains information about current actions.

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Servicing Equipment

NSM–5 specific:

Service SW disk 3.5” for NSM–5		0774080
Flash SW packages on CD global		0775314
RJ9 Connector Module for MJS–9		0201398
RAF–5 RF Adapter for JBU–6		0770396
MJS–75 Soldering Jig for NSM–5		0770233

Common to other models but needed also for NSM–5:

Service SW WinTesla disk 3.5”		0774071
FLA–7 Flash Loading Adapter		0080326
FLA–10 Flash Loading Adapter		0081346
FLS–4S POS Reflashing Tool	APAC	0080542
	Europe/Africa	0080541
FPS–4S Flash Prommer		0085095
TDF–4 Flash Security Box		0770106
JLP–1 IR module for TDF–4		0750079
JBU–6 Service Box		0770153
SCD–6 Pinset Cable		0080329
MJS–9 Module Test Jig		0770154
BBF–1 Flash Battery		0775206
XRF–1 RF Cable (SMA/N–connector)		0730085
XRS–3 RF Cable (N/N–connector)		0730184
SRT–3 Battery Connector Extractor tool		0770226
SCB–3 DC–DC Cable		0730114
XMS–3 Service Cable		0730174
PCS–1 DC Power Cable for JBU–6		0730012
DAU–9S Service MBUS Cable		0730108
AXS–4 D9 – D9 Cable (Included in FPS–4 sales pack)		0730090
AXS–4U D9 – D9 Cable		0730163
AXS–5 D15 – D15 Cable		0730091
PCC–1 DC Cable		0730053
PKD–1 Software Protection Key		0750018
Modular T–adapter		4626134

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Modular Cable Jack Connector (available e.g. as AMP code: P/N 555052–1)

*) Note: A number of PC's of an older generation use the Intel, National Semiconductor, or United Microelectronics IC 8250 as the serial port UART. This is a comparatively inefficient circuit for current purposes and does not necessarily support the M2BUS adapter at 9600 baud. The newer UART's NS16450 and NS16550AF of National Semiconductor offer solutions for these problems.

Installation

Mechanical Connections

Caution: Make sure that you have switched off the PC and the printer before making connections.

Caution: Do not connect the PKD–1 key to the serial port. You may damage your PKD–1 !

The software controls the phone via a separate adapter connected to the serial port of the PC, and to the telephone's M2BUS (DAU–9S).

Attach the dongle PKD–1 to the parallel port 1 (25–pin female D–connector) of the PC. When connecting PKD–1 to the parallel port, be sure that you insert the computer side of the PKD–1 to the PC (male side). If you use a printer on parallel port 1, install the PKD–1 between the PC and your printer cable.

The PKD–1 should not affect devices working with it. If some errors occur (errors in printing are possible) please try printing without the PKD–1. If printing is OK without the PKD–1 please contact your dealer. We will offer you a new PKD–1 in exchange for your old one.

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Installing the Service Software on PC Hard Disk

The program is delivered on a diskette and is copy protected with a dongle PKD–1. It must be present in parallel port when using Service software.

The program must be installed on the hard disk before use.

Keep the original diskette safe to enable upgrading of the program !

First time installation of WinTesla:

Do the following to make a complete WinTesla installation with support for NSM–5:

Insert the WinTesla software diskette into the floppy drive on your computer (i.e. Drive A:)

For Windows 3.1 and 3.11:

Start Windows, type *win <Enter>*

Open the File manager, open Main window and start File manager.

Select the floppy drive and:

Start installation, double–click the *wt_inst.exe* file.

Follow the instructions on the screen. Write down the directory where WinTesla is installed on your hard disk.

When installation has finished remove the WinTesla software disk from your floppy drive.

Insert the Dongle driver diskette into your floppy drive.

Select the floppy drive and:

Start installation, double–click the *dk2wn16.exe* file.

Follow the instructions on the screen.

When installation has finished remove the dongle driver software disk from your floppy drive.

Continue with the support modules installation.

For Windows 95, 98 and NT:

Open Microsoft Explorer, Select *Start –Programs – Explorer*

Select the floppy drive and:

Start installation, double–click the *wt_inst.exe* file.

Follow the instructions on the screen. Write down the directory where WinTesla is installed on your hard disk.

When installation has finished remove the WinTesla software disk from your floppy drive.

Insert the Dongle driver diskette into your floppy drive.

Select the floppy drive and:

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Start installation, double–click the *dk2wn32.exe* file.

Follow the instructions on the screen.

When installation has finished remove the dongle driver software disk from your floppy drive.

Continue with the support modules installation.

Installation of NSM–5 support modules (WinTesla already installed):

To install the new Service Software Program, follow the steps below:

Insert the new Service software diskette into the floppy drive on of your computer (i.e. Drive A:)

For Windows 3.1 and 3.11:

Start Windows, type *win <Enter>* and open the File manager.

Open Main window and start File Manager, select the floppy drive.

Start installation, double–click the *nsek13i.exe* file.

Follow the instructions on the screen.

For Windows 95, 98 and NT:

Open Microsoft Explorer, select *Start –Programs– Explorer*

Select the floppy drive.

Start installation, double–click the *nsek13i.exe* file.

Follow the instructions on the screen.

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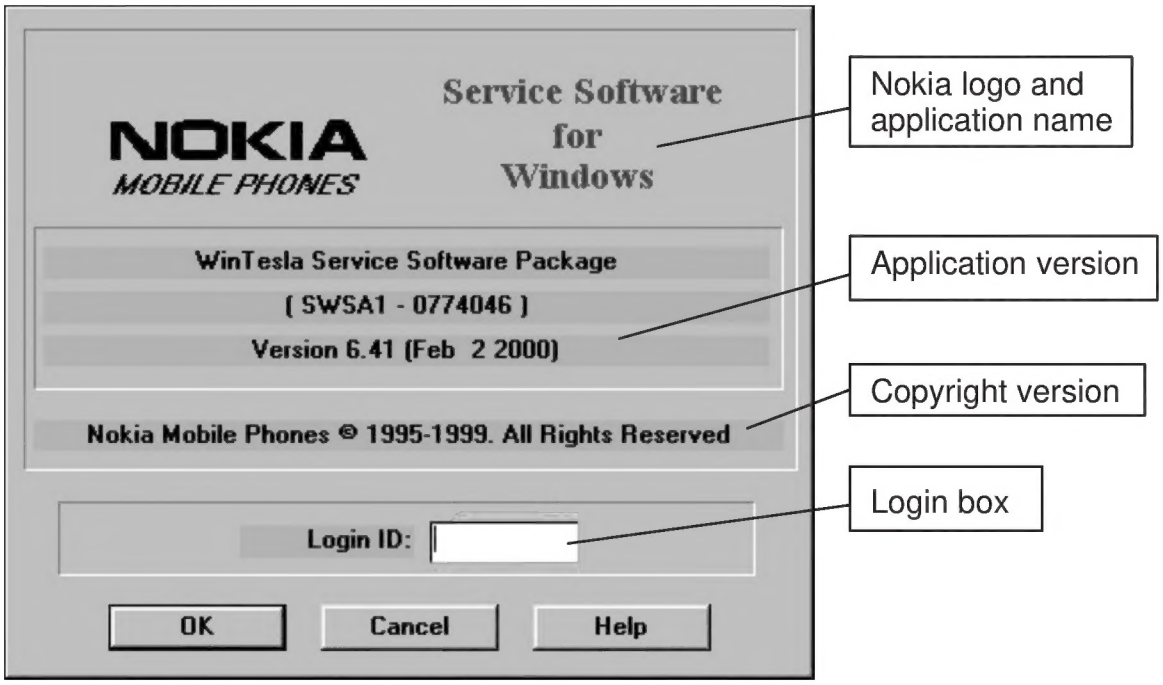
Common Properties of the User Interface

This chapter describes how the User Interface CLF (Common Look and Feel) must appear to the user.

The User Interface MUST be capable of being driven without the use of a mouse, as the service engineer rarely has space on the bench to use a mouse.

Login Dialog

When the Service Software application is invoked, by checking on the Service Software icon, the **Login** dialog box will be displayed on the screen.



Nokia logo and application name bitmap (–)

Displays Nokia logo and name of the application.

Application version static text (–)

Contains the name and version of the application.

Copyright notice static text (–)

Copyright is informed as: "**Nokia Mobile Phones (c) 1996. All Rights Reserved**".

Login Box edit box (–)

The user Login ID edit box, where the user enters his faultlog user name. (See Faultlog User Guide)

OK button (default key)

The user name is stored in memory and the dialog box is closed. When the dialog box is closed, the application starts.

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Cancel button (ESC)

The Dialog box is closed and application is started, but the Faultlog feature is disabled.

Help button (F1)

Activates the Windows Help application and displays context sensitive Help.

Main Window

Title bar

The *title bar* is located at the top of the window.

A title bar contains the following elements:

- Application Control–menu button
- Maximise button
- Minimise button
- Name of the application
- Restore button

The properties of these elements and their usage is described in Ref 3–Microsoft Windows Version 3.1 Users Guide chapter one (Windows Basics) and chapter two (Application Basics).

Menu bar

The *menu bar* is below the title bar and contains all available menu selections. The menu bar is a dynamic element and is dependent on the dongle type fitted, and whether a phone is connected.

Underlined characters in menu names and options indicates that the menu selection can be done by pressing *Alt*+ *underlined character*. Options can also be selected by activating menu bar with *Alt*– key (or *F10* key) and using arrow–keys to highlight the desired menu. In that case, selection is done by pressing *Enter*.

Menus can also be selected by using the mouse as described in Ref 3–Microsoft Windows Version 3.1 Users Guide

Status bar

The *status bar* is displayed at the bottom of the Service Software main window. The status bar contains information about the menu selections and events.

The left area of the status bar describes the actions of menu items as the user uses the arrow keys to navigate through menus.

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The status bar texts are explained in detailed in each of command's description.

The right areas of the status bar indicate which of the following keys are latched down:

Indicator	Description
USER	Entered Login ID.
CAP	The Caps Lock key is latched down.
NUM	The Num Lock key is latched down.
SCRL	The Scroll Lock key is latched down.

Tool bar

The *tool bar* is NOT defined and will not be implemented until specified by this document.

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Menu Bar

The Service Software package will have two menu bar configurations. The first, is an abbreviated version that contains the minimum number of menus that allows package configurations when a phone is NOT connected. The second is described below:

The menu bar MUST only contain the follow menus for the Service Software package when a phone is connected:

- Product*
- Configure*
- Tuning
- Testing
- Software
- Dealer
- View
- Help*

* – always displayed, even if no phone is connected.

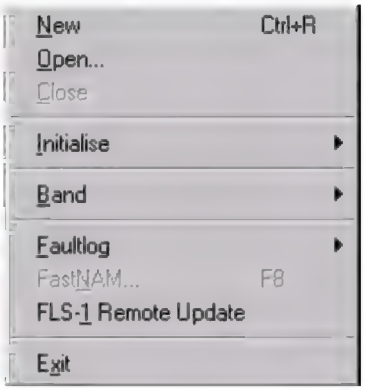
A menu is broken down into sections that are indicated with menu separators. Each sections identifies a logical difference from itself and other sections, i.e. between transmitter and receiver. Any items that are required to be added to a menu lists will be added on the bottom of the appropriate menu section list. If a new item is to be added which is common to two or more phone types, then that menu item will become a common menu item.

The menu lists will use the Microsoft [...] symbol after an item name to indicate that selecting that item will NOT initiate an operation immediately, i.e. a dialog box will be displayed for the user to select options or type in data and press the OK button before the operation is performed.

Product

The Product menu contains at least the following menu items:

- New Ctrl+R
- Open...
- Close
- Initialize
  - Normal Mode F5
  - Local Mode Shift+F5
- Faultlog
  - Activate Faultlog... F9
  - Edit Faultlog...
- Exit Alt+F4



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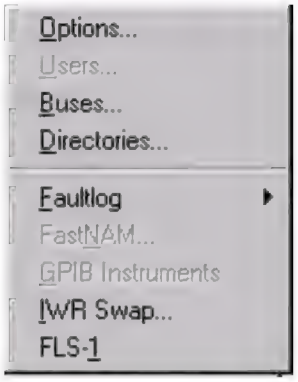
Configure

The Configure menu contains at least the following items:

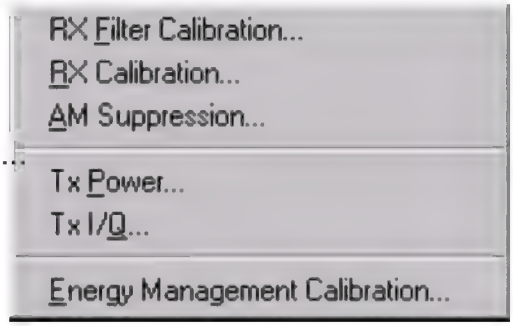
- Options...
- Directories...
- Faultlog...
- Phone Type Specific configuration items (where applicable)



Tuning

The Tuning menu contains at least the following menu sections:

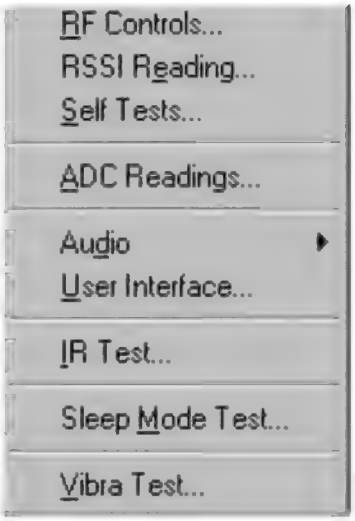
- RX Filter Calibration...
- RX Calibration...
- AM Suppression...
- Tx Power...
- Tx I/Q...
- Energy Management Calibration...



Testing

The Testing menu contains at least the following sections:

- RF Controls...
- RSSI Reading ...
- Self Tests
- ADC Readings
- Audio
- User Interface
- IR Test
- Sleep Mode Test...
- Vibra Test...



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Software

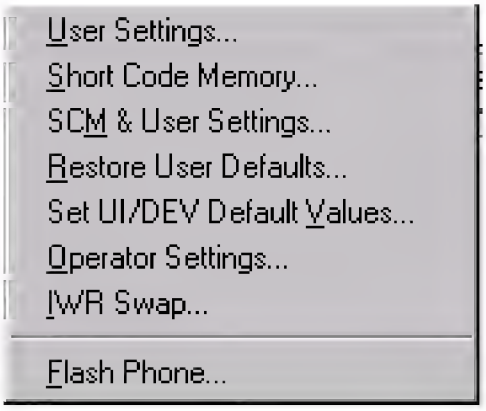
The Software menu contains at least the following menu sections:

- Product Profile...
- Start Up Self–tests...
- Set Factory Values
- Phone Identity...
- Warranty State...
- Production Data Edit...

Dealer

The Dealer menu contains at least the following menu sections:

- User Settings...
- Short Code Memory...
- SCM & User settings ...
- Restore User Defaults...
- Set UI/DEV Default Values ...
- Operators Settings...
- IWR Swap...
- Flash Phone...



View

The View menu contains at least the following sections:

- Quick/RF Info...
- Phone Information...

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Phone Identity Window

The Phone Identity window should contain, as a minimum, the following data:

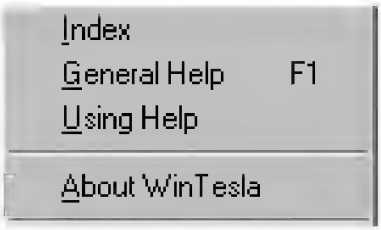
- Software Version(s)
- Hardware Version(s)
- Serial Number(s)
- Product Code

This window will only be used as a display window and therefore will not allow editing of the displayed data. This window will not contain any controls other than a scroll bar.

Help

The Help menu contains at least the following menu items:

- Index
- General Help
- Using Help
- About WinTesla



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Mouse Cursors

The standards Windows pointer will be used as the mouse cursor.

During time consuming tasks e.g. communication to phone, an hour glass will be shown informing the user that a task is in progress. The application uses the hour glass cursor to inform user that the application has taken the control and any actions from user will be ignored.

When a function is initiated, the hour glass will be displayed and when the function has finished the mouse pointer will return to normal.

Reserved Keys

The following Hot keys and Short Cut keys are reserved either as Microsoft standard keys or as part of the Common Look and Feel specified by this document.

Short Cut Function Keys

Key by	Description	Defined
F1	Context Sensitive Help	Microsoft
F5	Normal Mode	NMP
Shift+F5	Local Mode	NMP
F9	Activate Faultlog	NMP
F10	Goto Menu Bar	Microsoft
Ctrl+F4	Close Active Window	Microsoft

Alt Hot Keys

Key by	Description	Defined
Alt+F4	Exit Active Application	Microsoft
Alt+H	Help	Microsoft

Ctrl Hot Keys

Key by	Description	Defined
Ctrl+N	File – New	Microsoft
Ctrl+O	File – Open	Microsoft
Ctrl+P	File – Print	Microsoft
Ctrl+R	Product – New	NMP

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Shift Hot Keys

Key by	Description	Defined
Shift+F5	Local Mode	NMP

Key Strokes

Key by	Description	Defined
Alt+P	Product Menu	NMP
Alt+P,N	New	NMP
Alt+P,O	Open	NMP
Alt+P,C	Close	NMP
Alt+P,I	Initialize Pop–up	NMP
Alt+P,I,N	Normal Mode	NMP
Alt+P,I,L	Local Mode	NMP
Alt+P,B	Band	NMP
Alt+P,F	Faultlog Pop–up	NMP
Alt+P,F,A	Activate Faultlog	NMP
Alt+P,F,E	Edit Faultlog	NMP
Alt+P,X	Exit Application	NMP
Alt+C	Configure	NMP
Alt+C,O	Options	NMP
Alt+C,D	Directories	NMP
Alt+C,F	Faultlog	NMP
Alt+C,G	GPIB instruments (disabled)	NMP
Alt+T	Tuning Menu	NMP
Alt+T,F	RX Filter Calibration	NMP
Alt+T,R	RX Calibration	NMP
Alt+T,A	AM Suppression	NMP
Alt+T,P	Tx Power	NMP
Alt+T,Q	Tx I/Q	NMP
Alt+T,E	Energy Management calibration	NMP
Alt+E	Testing Menu	NMP
Alt+E,R	RF Controls	NMP
Alt+E,E	RSSI Reading	NMP

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Alt+E,S	Self Tests	NMP
Alt+E,A	ADC Readings	NMP
Alt+E,D	Audio	NMP
Alt+E,U	User Interface	NMP
Alt+E,I	IR Test	NMP
Alt+E,M	Sleep Mode Test	NMP
Alt+E,V	Vibra Test	NMP
Alt+S	Software Menu	NMP
Alt+S,P	Product Profile	NMP
Alt+S,S	Start–up Self Tests	NMP
Alt+S,V	Set Default Values	NMP
Alt+S,I	Phone Identity	NMP
Alt+S,W	Warranty State	NMP
Alt+S,D	Production Data Edit	NMP
Alt+D	Dealer Menu	NMP
Alt+D,U	User Settings	NMP
Alt+D,S	Short Code Memory	NMP
Alt+D,M	SCM & User Settings	NMP
Alt+D,R	Restore User Defaults	NMP
Alt+D,V	Set UI/DEV Default Values	NMP
Alt+D,O	Operator Settings	NMP
Alt+D,I	IWR Swap	NMP
Alt+D,F	Flash Phone	NMP
Alt+V	View Menu	NMP
Alt+V,Q	Quick/RF Info	NMP
Alt+V,P	Phone Information	NMP
Alt+H	Help Menu	Microsoft
Alt+H,I	Index	Microsoft
Alt+H,G	General Help	Microsoft
Alt+H,U	Using Help	Microsoft
Alt+H,A	About WinTesla	NMP

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Help Functions

The Help User Interface will be the standard Windows help tool called WinHelp.

The context sensitive help is activated with **F1**–key. Help contains also Using Help which describes how to use help facility. Refer to the Windows manual for detailed description on the Windows Help.

Dialog boxes

The Service Software application uses many different dialog boxes. Dialog boxes are used to display data and prompt the user for input.

Dialog boxes are opened from menus or with shortcut keys. Dialog boxes have different properties but some features are common.

All service dialog boxes must be modal, that is, the user will not be able to start another operation without first closing the present dialog box.

All dialog boxes will contain the following entities:

– Help button

– Title bar

– At least one button other than Help

– Application Control–menu Button

Common Dialog boxes

This sections describes the common dialog boxes used in the Service Software package, and the context in which they will be used.

Note Message Box

When the user has made an illegal selection, a *note message box* dialog will be opened and message text is displayed. The message box is also opened when the program has some information for the user. The size of the dialog box may vary. An information dialog box is recognized by the **!**–icon.

The dialog box will also contain an OK button and a Help button.

OK button (default key):

Acknowledge displayed information and continue. The dialog box is closed after selection.

Help button (Alt+H):

Opens context sensitive help as F1–key does.

Query Message Box

Confirmations and questions are asked in *a query message box*. A query dialog box is recognized by the **?**–icon.

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The dialog box will also contain a Yes button, a No button, and a Help button.

Yes button (Alt+Y or Y) (default key):

Accepts confirmation or question.

No button (Alt+N or N):

Denies confirmation or question.

Help button (Alt+H):

Opens context sensitive help as F1–key does.

The buttons may also be OK and Cancel. The operation of these buttons are the same as in the Note dialog box.

Error Message Box

Error message dialog boxes use the Stop–icon. When a “Stop”–dialog box is shown, the current operation is terminated.

The dialog box has a description about the failed operation and reason. Pressing F1 (Help) application opens the appropriate help topic that gives information about recommended actions.

The dialog box will also contain an OK button and a Help button.

OK button (default key):

Acknowledges displayed information and terminate current operation. The dialog box is closed after selection.

Help button (Alt+H):

Open context sensitive help as F1–key does.

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Custom Dialog boxes

All custom dialog boxes will contain the predefined buttons as defined below in the section – *Buttons.* However, it is recognised that features may require additional button types, but the addition of these non–standard buttons should be carefully considered to minimise any inconsistencies between implementations.

The buttons will be positioned down the right–hand side of the dialog boxes. The default action will be **OK**, except where that default action could result in an irretrievable failure.

All tuning dialogs that contain tuning results, will display the old tuned data read from the phone before the tuning was performed, as well as the newly tuned data.

List boxes will be used to display lists of data, such as tuning data, test results etc.

The use of Radio buttons should be limited and carefully considered. The use of radio buttons defines the number of possible choices available to the user, which may be acceptable for one project, but not for another.

Buttons

All buttons must be the Microsoft style of buttons.

In general, the default button will be the action button, the Close button or the Yes button, but this will depend on the context of the dialog box that the button is associated with.

(action) button:

Accepts and validates entered settings and values and closes the dialog. If the values have not been changed, then no action will be taken. The status bar will reflect the status. The user should only be queried, if the settings or values accepted will over–write data that CAN NOT be reproduced.

A greyed **OK** button indicates that settings selected by the user are not acceptable.

Close button:

Closes the current dialog box. Does not send or store anything and closes the dialog. The Close button is only used for dialogs that do not set or change any data.

Cancel button (Esc):

Cancel operation. Does not send or store anything and closes the dialog box.

A greyed **Cancel** button indicates that it is not possible to quit from this dialog box.

Yes button (ALT+Y or Y):

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Replies Yes to a question asked of the user.

No button (ALT+N or N):

Replies No to a question asked of the user.

Help button (ALT+H):

Opens context sensitive help as F1–key does.

Reporting Status

The status bar will be used to report the present status to the user. When a feature is initiated, the status bar will be updated with a brief description of the function. The status bar will also be updated at key points in a time consuming function.

If an error is to be reported to the user, it will be displayed in the status bar as well as displayed in a common error dialog box. This will mean the user is not delayed from progressing on to the next operation unless an error occurs, in which case, the user will have to acknowledge the error by pressing the OK button.

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NSM–5 FEATURES

Menu bar

After Sales SW's menus follow the menu structure specified in WinTesla User Interface Specification. This specification will describe functionality that differs from WinTesla specification.

Product

New command

Activation	Status Bar Text
Alt, P, N Ctrl+R	Rescan a new phone

If phone is changed (with same phone type only serial number is changed) phone will be initialised to local/normal mode (selected in TESLA.INI). If phone is changed to different phone type the current DLLs are unloaded and new ones are loaded for that phone.

If the Quick/RF Info view is open, window will be automatically updated.

If Phone Information view is open, window will be automatically updated.

NOTE: When different type of phone is changed user should select Product/New, so that application recognises phone type change and loads correct menu.

Open... command

Activation	Status Bar Text
Alt, P, O	Force load phone specific functionality

Phone is set to local/normal mode. If no phone is found, connection parameters (from Configure/Busses) are displayed to user and application asks from user does (s)he want to use that connection to flash a phone. If user selects **Yes**, current connection is used and flash only menu is loaded. If user selects **No**, application tries next connection, if there is one.

Initialise... command

Activation	Status Bar Text
Alt, P, I	

Opens a submenu which contains the following options:

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Normal Mode

Activation	Status Bar Text
Alt, P, I, N	Initialises phone to normal mode
F5	

When normal mode has been activated or program has been started, self–test results will be asked from MCU. If fault was found in the tests, an error message is shown. If normal mode has been set successfully (no self test error has been found), and paging listening has been started, the used AFC value is requested from MS.

Initialisation routine checks phone's cellular type and if unsupported phone is detected, application unloads the DLLs.

The After Sales SW sets automatically the MS state to normal mode when needed.

If phone identification view is open, window will be automatically updated. Also if RF Information Window is open it will be updated to quick info view.

NOTE: When phone is changed to but phone type does not change, user may select Product/Initialise/Normal Mode instead of Product/New.

Local Mode

Activation	Status Bar Text
Alt, P, I, L	Initialises phone to local mode
Shift+F5	

Selection will change the MS state to *local*. When user selects item from Testing or Tuning menus, the After Sales SW software will change automatically the MS state to local.

The After Sales SW sets automatically the MS state to normal mode when needed.

Also if quick info view is open it will be updated to RF Information view.

Band... command

This menu selection is for dual band phones.

Activation	Status Bar Text
Alt, P, B	Opens a submenu which contains following options:

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GSM

Activation	Status Bar Text
Alt, P, B, G	Set phone to GSM band.

PCN

Activation	Status Bar Text
Alt, P, B, P	Set phone to PCN (GSM1800) band.

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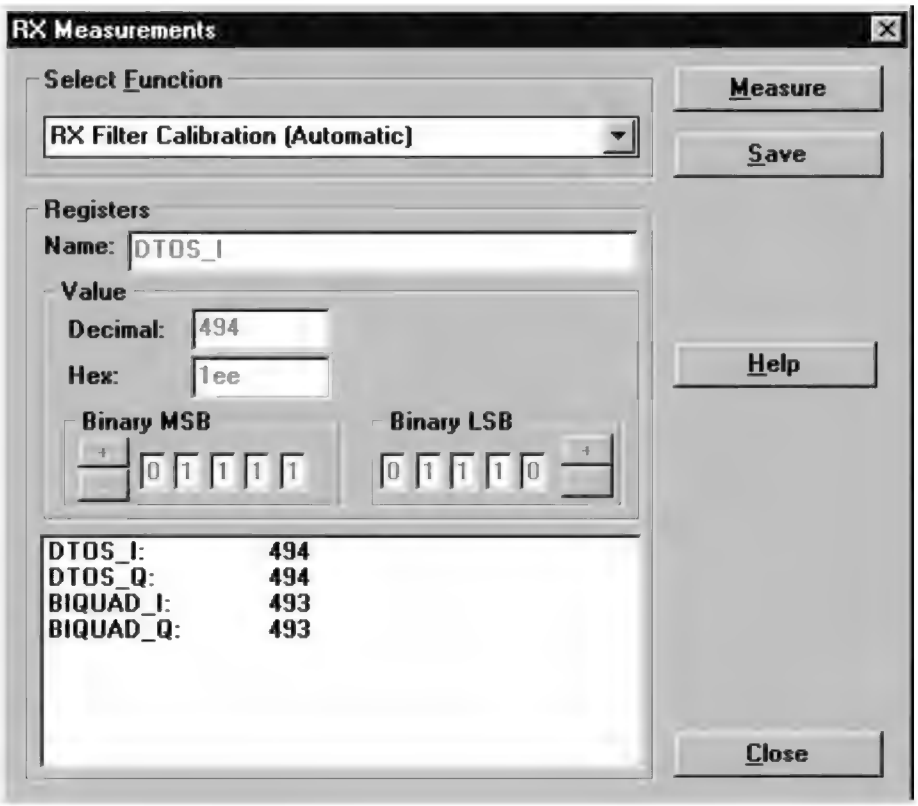
Tuning

The tuning menu offers functions for ME adjustments.

RX Filter Calibration... command

Activation	Status Bar Text
Alt, T, M	Open RX Measurements dialog box

Starts RX Filter Calibration tuning for the phone.



Dialog mode: **Modal**

RX Measurements dialog has the following items:

Select Function listbox:

Shows list of automatic selections. When selection is made values are loaded from phone.

Value group:

This group has several items. At the bottom there is a list of registers and values they currently have. Double clicking a record from the list will bring it's name to the name edit box. The value is shown in the three different format decimal, hexadecimal and binary. All these controls display the same value and changing one causes changes to others too.

Measure button:

This button activates the measurement.

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Save button:

This saves values to the phone.

Close button:

This button closes the dialog without saving anything.

Help button:

This button opens help.

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RX Calibration... command

Activation	Status Bar Text
Alt, T, R	Open RX Calibration dialog box

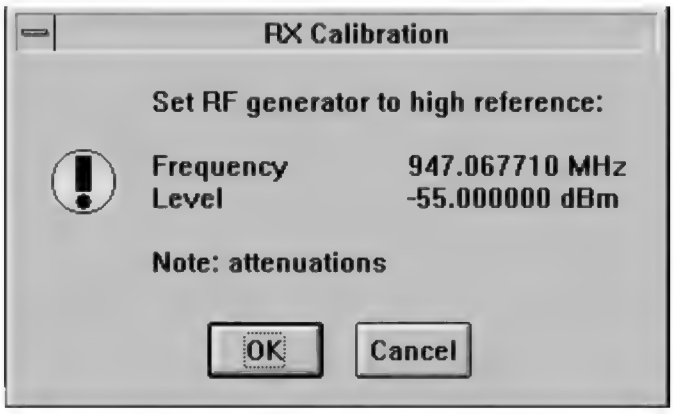
Starts RX calibration.

The next automatic selections are made when this tuning function is activated:

- Phone is set to local mode
- Update RF information window

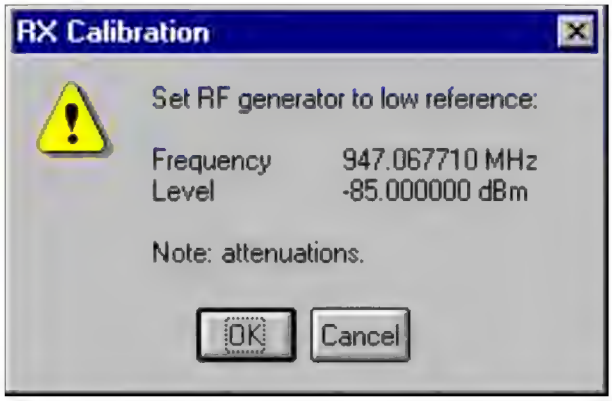
The measurement is started automatically when RX calibration is entered. The measurement is done in five steps:

1. User is requested to put signal generator to high input level (read from .INI file).



2. Measurement with high input level is executed

3. User is requested to put signal generator to low input level (read from .INI file).



4. Measurement with low input level is executed

5. The **RX Calibration** dialog will be updated when previous steps are done.

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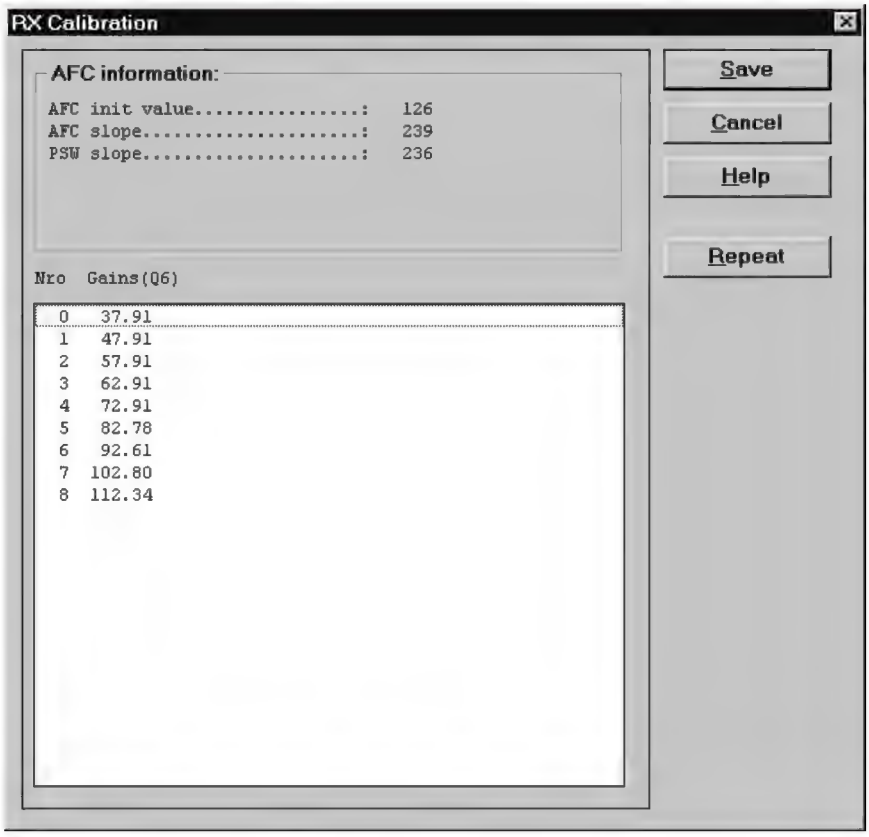

Dialog mode: **modal**

RX Calibration dialog has the following items:

AFC information box:

Shows AFC init value, AFC slope and PSW slope values.

AGC List box (ALT+A):

AGC, DAC, Voltage.

Repeat button (ALT+R):

Measurement can be started again by pressing this button.

Save button (ALT+S):

Dialog is closed and tuning *is saved* to phone.

Cancel button (ESC):

Dialog is closed and tuning *is not saved* to phone.

When calibration is ended, the DAC value checking is made and if it is not successful, error message is shown.

When exit is made, the next selections are set to the values which were selected before this adjustment.

Operation Mode

Update RF Information window

The exit and the use of AGC–control values is done same way as exit from power level tuning and power coefficient use:

NOTE: After GSM calibration the same tuning must be made for the PCN band also! To change the band go to *Product Menu* and select *Band*, *PCN.*

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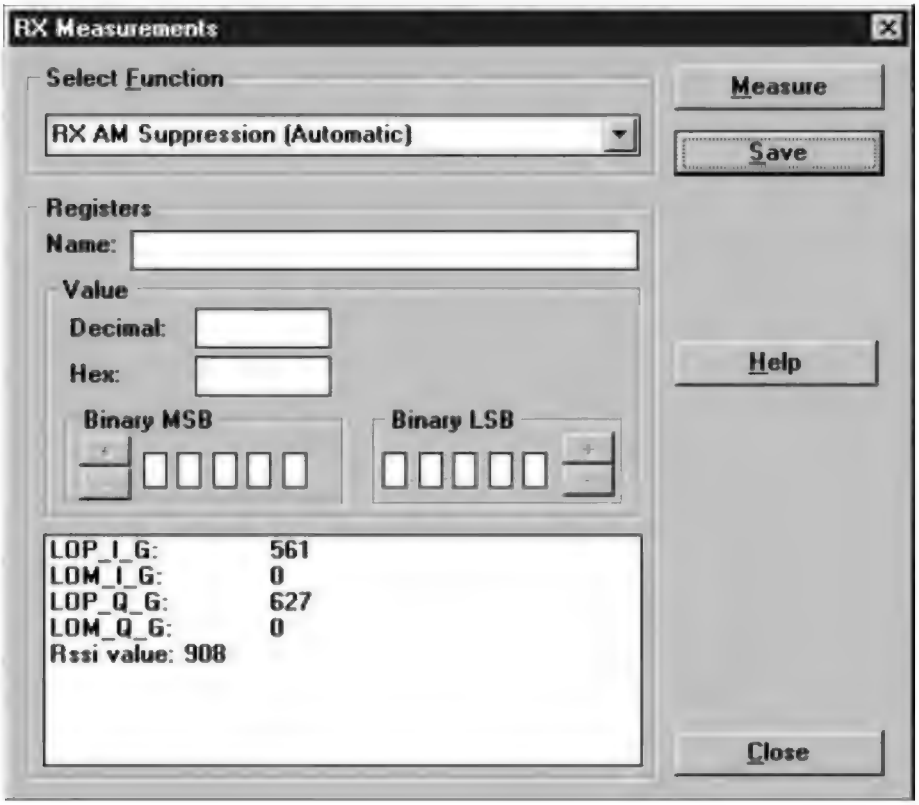
RX AM Suppression... command

Activation	Status Bar Text
Alt, T, M, A	Open RX Measurements dialog box

Starts RX AM Suppression tuning for the phone.



Dialog mode: **Modal**

RX Measurements dialog has the following items:

Select Function listbox:

Shows list of automatic selections. When selection is made values are loaded from phone.

Value group:

This group has several items. At the bottom there is a list of registers and values they currently have. Double clicking a record from the list will bring it's name to the name edit box. The value is shown in the three different format decimal, hexadecimal and binary. All these controls display the same value and changing one causes changes to others too. Last line shows RSSI value.

Measure button:

This button causes the measurement to be done. When selected following dialog is shown.

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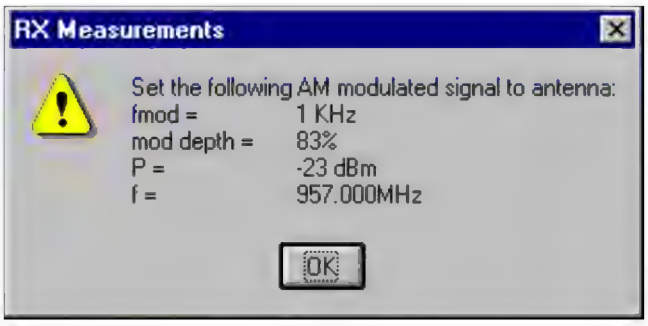

Save button:

This saves the values to the phone.

NOTE: After GSM Suppression the same tuning must be made for the PCN band also! To change the band go to *Product Menu* and select *Band*, *PCN.*

Close button:

This button closes the dialog withour saving anything.

Help button:

This button opens help.

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Tx Power... command

Activation	Status Bar Text
Alt, T, X	Open TX Power Tuning dialog box

Starts TX power tuning.

When user has PKD–1 dongle in place tuning is started automatically with EEPROM values.

Tuning values are loaded from program's internal memory.

The next automatic selections are made when this tuning function is activated:

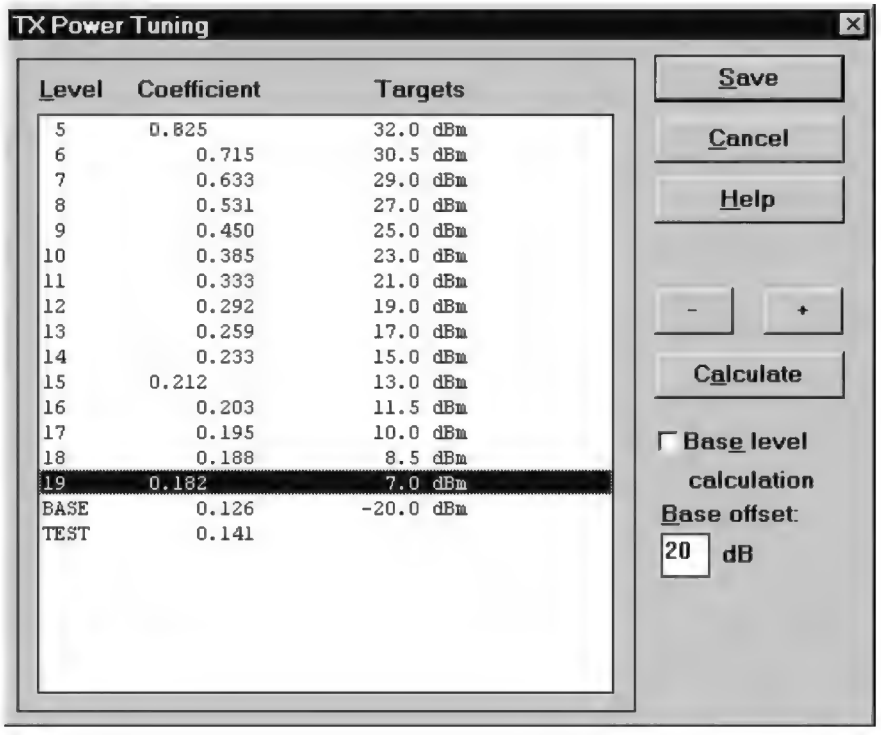
the BASE power level is selected

Operation mode = TX pulsed

The **TX Power Tuning** dialog will be activated automatically after value selection.

NOTE: Make sure you are working with GSM900 band. First tune power levels 5, 15 and 19. Then Calculate the other levels and save the values. After this switch to PCN band and do the tuning to levels 0, 11 and 15. Then Calculate the other levels and save the values.

GSM900 TX Power Tuning dialog:



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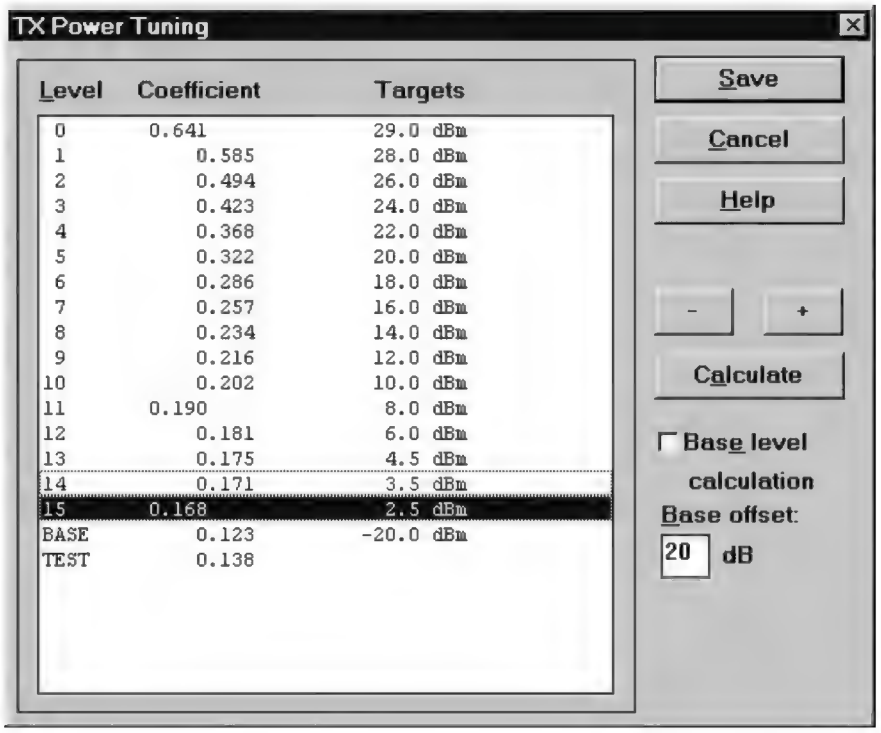
GSM1800 TX Power Tuning dialog:



Dialog mode: **modal**

TX Power Tuning dialog has following items:

Level, Coefficient and Targets list box (ALT+L):

The power is presented in GSM or PCN values. The base power is selected automatically when the dialog is opened. The test value is not saved to the EEPROM. The test value can be changed during tuning as other power coefficients and the program remembers its value when tuning function is activated later again.

If there is more power levels in the phone that can fit into window the window is scrollable. When phone is initialised the program asks the number of power levels used in the phone.

Only three power coefficients (highest, third smallest and lowest) are needed to tune (left justified Coefficients) and the rest of them are calculated.

The tuning position is highlighted and can be tuned with +/– keys or left/right cursor keys.

Calculate button (ALT+C):

The calculation is activated with this button. The power coefficients which are calculated from the tuned coefficients are displayed on the different columns than the others. All values can be tuned if needed. When **Base level calculation** is checked, base level is calculatede and new base level target to list box is updated.

Base level calculation check box:

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If this box is checked the base level is calculated.

Base offset edit box:

This edit box shows the base offset value that user can change. The base level calculation check box must be checked before this value is used. After this value is changed user must do the calculation.
NOTE: Do not use Enter–button to accept this value.

+/– buttons (+/– and left/right cursor keys):

+ and – buttons will cause power changing by 0.25dB steps. When these keys are used the coefficient value is updated on the tuning window.

Save button (ENTER):

Dialog is closed and tuned values are *saved* to phone. Base offset is saved to TESLA.INI.

Cancel button (ESC):

Dialog is closed and tuning *is not saved* to phone.

When selections are used, the power value checking is made and if it is not successful, error message is shown. The test checks that all power coefficients are in descending order (same order than power levels).

If the power tuning function is ended and EEPROM values are not received or EEPROM fault is noticed, an error message is shown.

When all power coefficients have such values that they don't cause any error messages, they can be saved. The last used tuning power is in use after exit.

The next automatic selection is made when this tuning function is ended:

Operation Mode = RX pulsed

When dialog is closed original band is selected.

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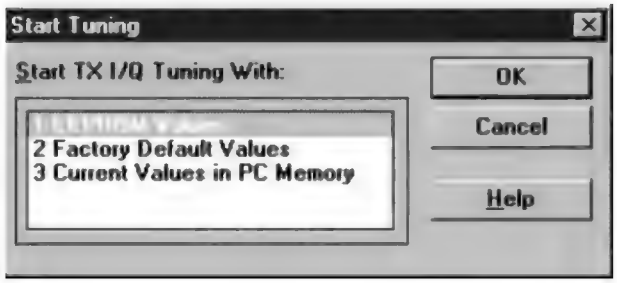
Tx I/Q... command

Activation	Status Bar Text
Alt, T,Q	Open TX I/Q Tuning dialog box

This function is used for tuning TX I and Q branch DC offset, amplitude difference and phase difference.



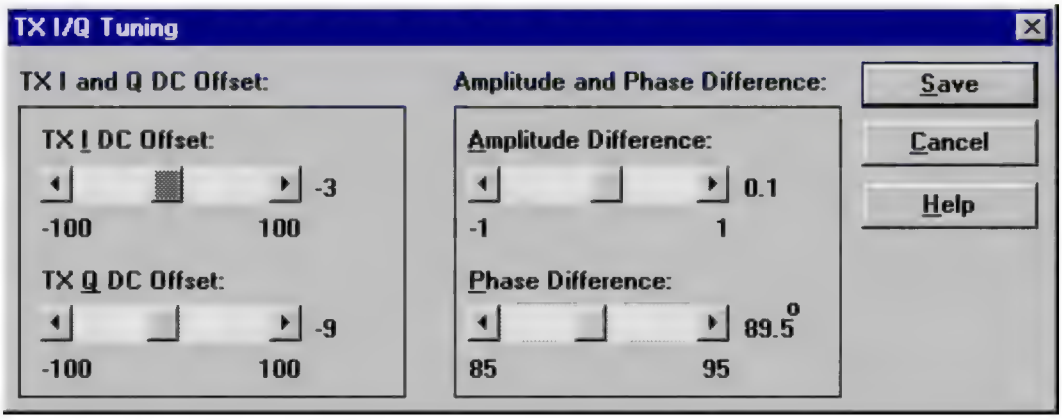
If user has PKD–1 dongle and other than NSM–X phone, then tuning is started automatically with EEPROM values. When using other dongles this selection opens same **Start Tuning** dialog as with TX Power Tuning.

The next automatic selections are made when this function is activated:

Operation Mode = TX pulsed

Update RF Information window

The **TX I/Q Tuning** dialog is opened.



Dialog mode: **modal**

TX I/Q Tuning has following items:

Tune TX I DC Offset scroll bar (ALT+I):

The DC Offset is shown as percents (%) from the ± maximum value. 0% means that there is no DC. The value range is –100%...100%. The value is rounded to the nearest integer value.

Tune TX Q DC Offset scroll bar (ALT+Q):

The operation of this function is the same as one above, except with this selection the Q branch DC Offset is tuned. The value range is –100%...100%. The value is rounded to the nearest integer value.

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Tune Amplitude Difference scroll bar (ALT+A):

When this selection is made user can increase or decrease the amplitude difference within 0.1 dB steps. The value range is –1...1.

Tune Phase Difference scroll bar (ALT+P):

When this selection is made user can increase or decrease the phase difference within 0.5° steps. The current phase difference is shown on the tuning window with numbers and bar figure. The value range is 85...95.

Save/OK button (ENTER):

Dialog is closed and tuning *is saved* to phone. When tuning NSM–X phones in GSM band button values are only saved to PC memory and those values may be used when tuning is started in PCN band.

Cancel button (ESC):

Dialog is closed and tuning *is not saved* to phone.

After each value change the new value is sent to the phone.

The next automatic selection is made when TX I / Q tuning function is ended:

Operation Mode = RX pulsed

Update RF Information window

NOTE: Tuning needs to be done for GSM900 and GSM1800 bands separately.

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Energy Management Calibration... command

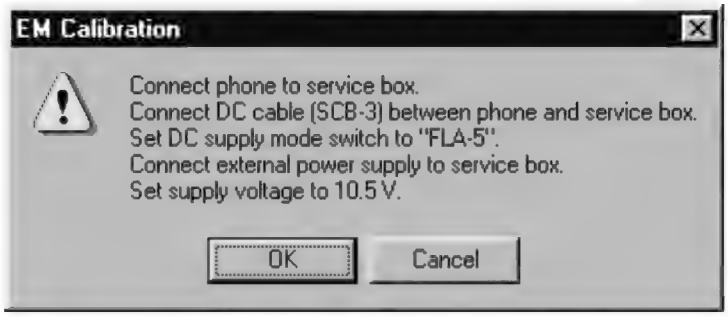
Activation	Status Bar Text
Alt, T,E	Calibrate Battery Voltage

This function is for battery a/d and charge current tunings.

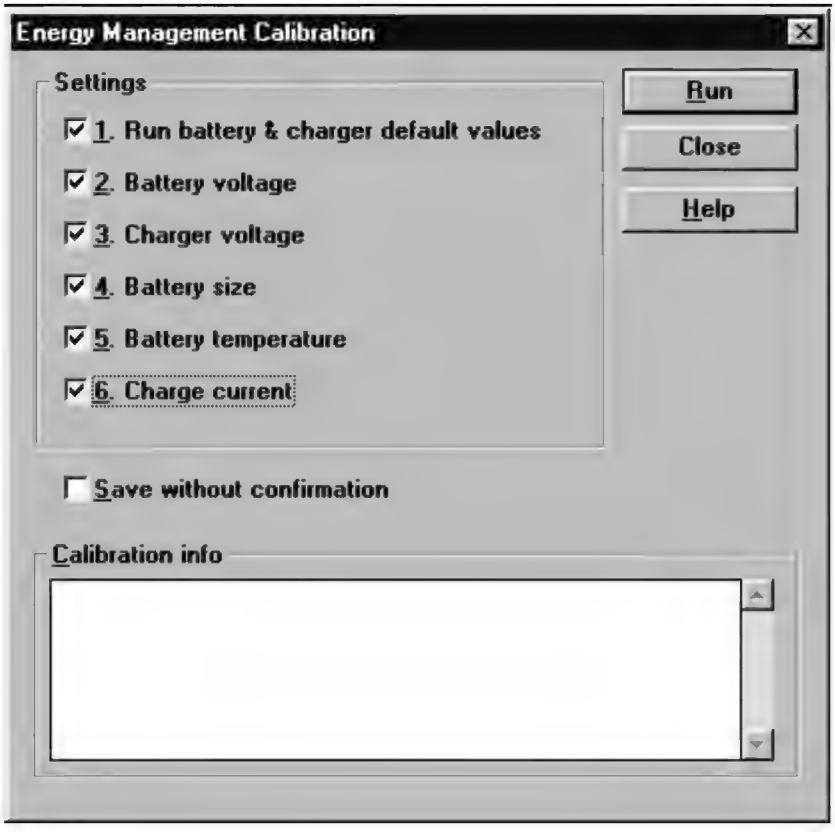
NOTE: This Calibration must be done when N100, N101 or a discrete component affecting these two is changed.

Before battery a/d tuning is started a voltage setting request is shown to user (Set supply voltage to 10,5 V). Service Battery is in this case JBU–6.

NOTE: Set DC Supply Mode in JBU–6 in FLA–5 (FLA–5/7) position! Remember to connect SCB–3 cable between Service Box JBU–6!


EM Calibration
Connect phone to service box.
Connect DC cable (SCB-3) between phone and service box.
Set DC supply mode switch to "FLA-5".
Connect external power supply to service box.
Set supply voltage to 10.5 V.
OK
Cancel

When external power is connected and user selects Yes to continue, the application displays the **Energy Management Calibration** dialog box:



Dialog mode: **modal**

Energy Management Calibration dialog has following items:

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Settings group box:

Contains EM calibration setting checkboxes:

1. Run battery & charger default values checkbox (ALT+1):

Runs battery & charger default values to phone when selected

2. Battery voltage checkbox (ALT+2):

Calibrates battery voltage A/D value.

3. Charger voltage checkbox (ALT+3):

Calibrates charge voltage A/D value.

4. Battery size checkbox (ALT+4):

Calibrates battery size A/D value.

5. Battery temperature checkbox (ALT+5):

Calibrates battery temperature A/D value.

6. Charge current checkbox (ALT+6):

Calibrates charging current.

Save without confirmation checkbox (ALT+S):

When selected, all selected calibrations are saved to phone without confirmation, otherwise user must confirm every A/D value saved to phone. Calibration info is automatically scrolled during confirmation.

Calibration info listbox (ALT+S)

Shows information about current calibrations.

Run button (ENTER):

All selected settings are executed.

Close button (ESC):

Dialog is closed.

Help button (ALT+H):

Context sensitive help.

After battery a/d tunings a voltage setting request is shown to user (Set supply voltage to 8.0 V).

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Testing

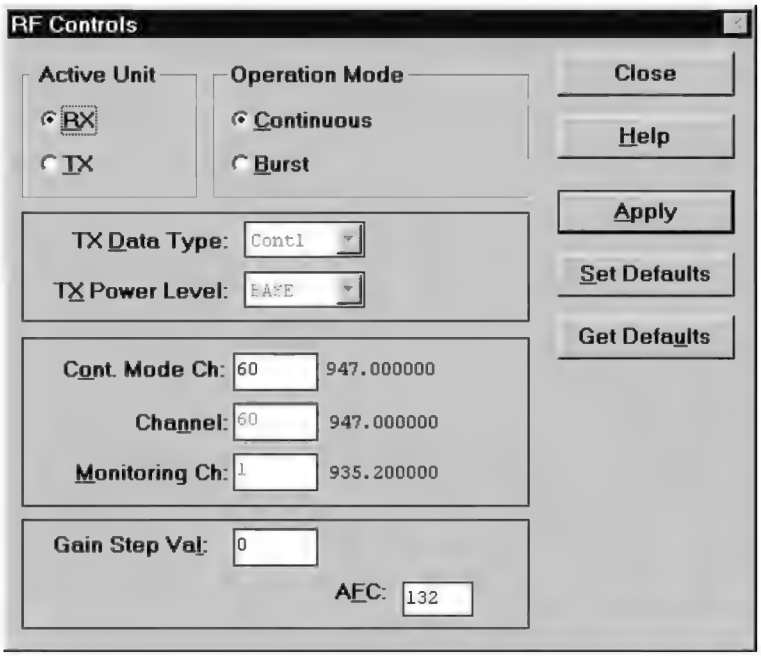
The Testing sub menu offers functions for ME testing.

RF Controls... command

Activation	Status Bar Text
Alt, E,R	Open RF Controls dialog box

This function is used for RF testing.

Command opens **RF Controls** dialog, which contains data for testing and adjustments.



Dialog mode: **modal**

RF Controls dialog has following items:

Active Unit group:

RX radio button (ALT+R):

When *RX* is selected, the next functions are made:

Data transmission is deactivated

TX power is deactivated

If operation mode is continuous,

– AGC is controlled

– RX continuous mode channel is activated

RF Information window is updated

The RX value is always given as default.

Note! Function is activated immediately, Apply is not needed.

TX radio button (ALT+T):

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When *TX* is selected, the next functions are made:

Data transmission is activated

If operation mode is continuous,

– Operation mode is set to burst

RF Information window is updated

Continuous mode radio button is disabled.

Note! Function is activated immediately, Apply is not needed.

Operation Mode group:

Continuous radio button (ALT+C):

When *continuous* selection is used,

synthesiser is set to constant frequency

synthesiser channel number is as given with Continuous Mode Channel selection

transmitter power is not connected

if Active Unit is RX, AGC is controlled

Note! Function is activated immediately, Apply is not needed.

Burst radio button (ALT+B):

When *burst* selection is used,

synthesiser is controlled by using receiving/transmission/ measuring synthesiser control sequence

synthesiser channel numbers are as given with Channel/ Monitoring Channel selections

if Active Unit is TX, data (selected with TX Data Type) is sent and the TX power is connected

Note! Function is activated immediately, Apply is not needed.

TX Data Type drop list (ALT+D):

This list changes the transmission data type. List consists following options: 0, 1, Random and User. After Random data selection 0 is used. If Operating Mode is *continuous*, TX Data Type Random causes different data sending than in burst mode. User data is defined in TESLA.INI file by the user (open).

TX Power Level edit box (ALT+T):

With this value is possible to change the transmission power. The user can give the needed power value or select the test value, which is tuned with TX power tuning function. The test value is found at the end of the list.

TX Power have value *OFF* and is disabled (*greyed*) when active unit is RX. When the TX power is tuned with test value (smallest value) the TX Power has value *TEST*.

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Channel edit box (ALT+H):

User can enter here channel number that is used for both transmission and receiving. The frequency of the selected channel is shown after selection.

Monitoring Channel edit box (ALT+M):

This field selects neighbour monitoring channel. The frequency of the selected channel is shown after selection.

Continuous Mode Channel edit box (ALT+C):

To this edit box user can type continuous mode channel which may have all channel numbers.

The used frequency depends on the Active Unit. If Active Unit is RX, then RX frequency is used, else TX frequency. The frequency of the selected channel is shown after selection.

Gain Step Value edit box (ALT+L):

This selection allows user to set up the receiver gain step in continuous mode. There are nine (0...8) steps. In the burts mode selection is automatic.

AFC edit box (ALT+F):

This selection allows user manually tune the 26 MHz clock. Limits are –1023...–1024

Apply button (ALT+A):

Accepts entered values and validates them. After validation application sends corresponding messages to ME. Closes dialog and updates Info Window.

Note! Active Unit and Operation mode are not send with because they are activated immediately.

Set Defaults button (ALT+S):

Sets current values as default Rf Controls values.

Get Defaults button (ALT+U):

Gets default Rf Controls values as current values.

The next automatic selection is made when Quick testing function is ended:

Active Unit = RX

Update RF Information window

The next table shows the dialog's properties on different situations:

ACTIVE UNIT = TX:

TX Data Type: Updated

AGC values: Greyed

Monitoring Channel: Greyed

OPERATION MODE = BURST:

TX Power Level: Updated

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Continuous Mode Channel: Greyed
Channel: Updated
OPERATION MODE = CONT.:
TX Power Level: OFF, Greyed
Continuous Mode Channel: Updated
Channel: Greyed

ACTIVE UNIT = RX:

TX Data Type: Greyed
TX Power Level: OFF, Greyed
OPERATION MODE = BURST:
AGC values: Greyed
Continuous Mode Channel: Greyed
Channel: Updated
Monitoring Channel: Updated
OPERATION MODE = CONT:
AGC values: Updated
Continuous Mode Channel: Updated
Channel: Greyed
Monitoring Channel: Greyed

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RSSI Reading... command

Activation	Status Bar Text
Alt, E,R	Read continuously RSSI value

Command opens RSSI Reading dialog:

Dialog mode: **modal**

RSSI value is read continuously until user presses ESC–key or Close button to cancel reading.

RSSI Reading dialog has following items:

Close (ENTER) button:

Closes the RSSI Reading dialog. Does not send anything to phone.

Help button:

Context sensitive help.

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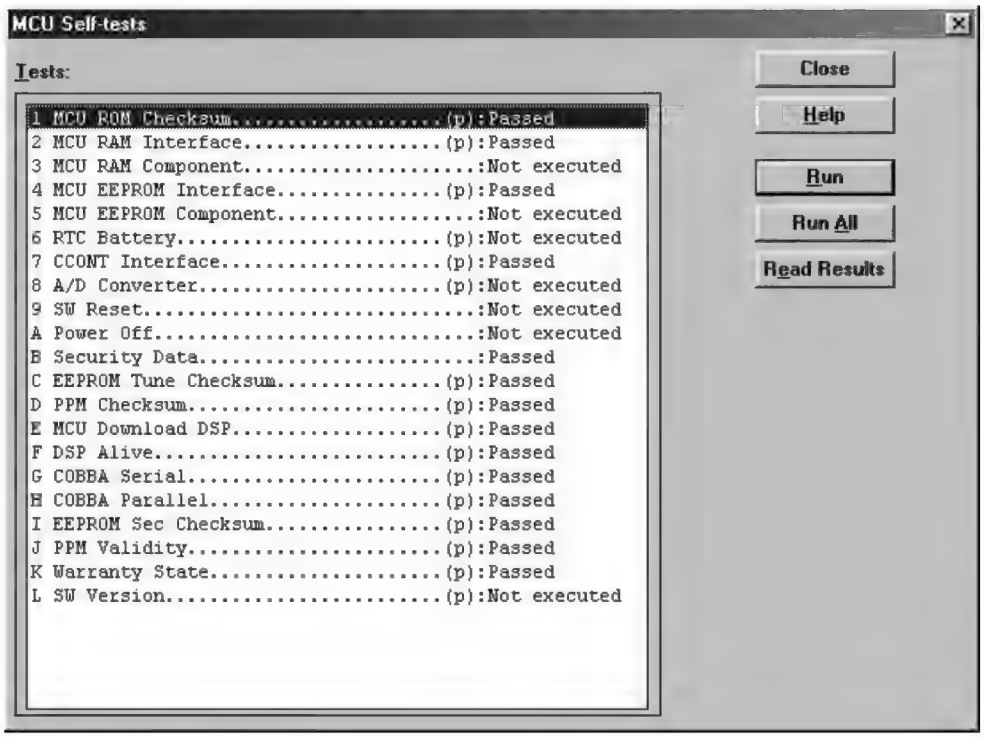
Self Tests... command

Activation	Status Bar Text
Alt, E,S	Open MCU Self–tests dialog box

Command is used for reading self test results and running self tests.

When the selection is made, the test result is read from ME. The test result will be shown to the user within **MCU Self–test** dialog.



Dialog mode: **modal**

MCU Self–test dialog has following items:

Tests list box (ALT+T):

The field ”(p)” in the screen example means that the test is also run in power up. The field “/s)” means that this test is selectable one.

Test states are updated according to results received from the phone. Possible test states will be one of the next:

Passed

Failed

No response

Not executed

Not valid

RUNNING....

Note that power–off test have no values, because if test has been passed, power has been turned off. If power–off test fails a special error

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message window is shown. If no response is received to power off test message in a few seconds, the user is informed by special info window, where user is asked to turn the power on and then press the return key.

Note also that power–off test (if passed) turns power off and power should be reconnected by using the phones keypad after the successful test. After the power has been connected to phone, the normal start–up routines are made and the self–test results are shown in the MCU self–tests menu (i.e. all other than power–up self–tests are in *Not executed* state after the power–up routines).

Run button (ALT+R):

User can select desired test from list and hit **Run** button. When user selects test to be run the text *RUNNING...* is shown in test state field and test is run. When results are received the test state field is updated according to the result.

If no response was received in the defined time, a *error message box* will be shown and the test state is changed to *No response.* Phone is set to local mode if it is not already.

Run All button (ALT+A):

User can run all listed tests. The text *RUNNING...* is shown in test state field and test is run. When results are received the test state field is updated according to the result. When state field is updated application moves to next test and repeats previous cycle. Phone is set to local mode if it is not already there.

Supported Self Tests

1 MCU ROM Checksum.....

2 MCU RAM Interface.....

3 MCU RAM Component.....

4 MCU EEPROM Interface.....

5 MCU EEPROM Component.....

6 RTC Battery.....

7 CCONT Interface.....

8 A/D Converter.....

9 SW Reset.....

A Power Off.....

B Security Data.....

C EEPROM Tune Checksum.....

D PPM Checksum.....

E MCU Download DSP.....

F DSP Alive.....

G COBBA Serial.....

H COBBA Parallel.....

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I EEPROM Sec Checksum.....

J PPM Validity.....

K Warranty State.....

L SW Version.....

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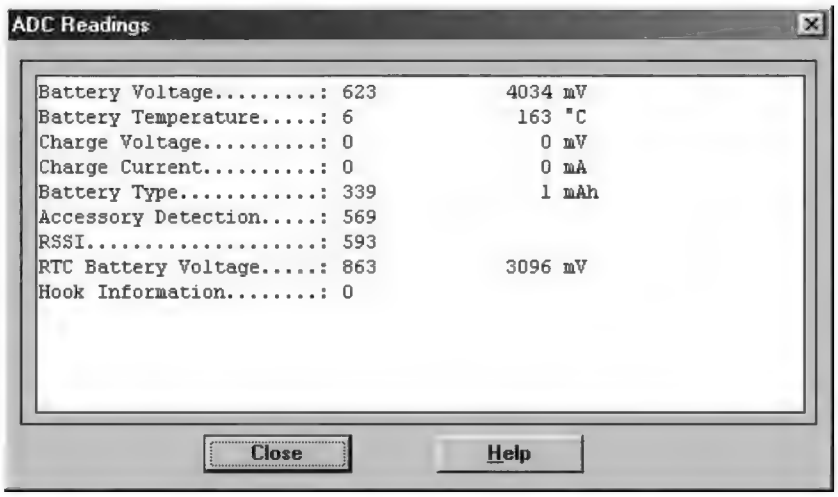
ADC Readings... command

Activation	Status Bar Text
Alt, E,A	Open ADC Readings dialog box.

Command is used to read and show A/D values from phone.

Command opens **ADC Readings** dialog.



Dialog mode: **modal**

ADC Readings dialog has static text field where measurements are updated to window every one second.

ADC Readings dialog has following items:

Close (ENTER) button:

Closes the ADC Readings dialog. Does not send anything to phone.

Help button:

Context sensitive help.

A/D Readings:

Following a/d readings are measured:

Battery Voltage.....:

Battery Temperature.....:

Charge Voltage.....:

Charge Current.....:

Battery Type.....:

Acessory Detection.....:

Hook.....:

RSSI.....:

VCXO Temperature.....:

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Audio... command

Activation	Status Bar Text
Alt, E,U	

Opens a submenu which contains following options:

Internal Audio Loops

Activation	Status Bar Text
Alt, E,U,I	Open Internal Audio loops dialog box.

Command is used for making internal audio loop tests in **Internal Audio Loops** dialog.

Dialog mode: **modal**

Internal Audio Loops dialog has following items:

Buzzer Volume group:

Next three different values can be selected for Buzzer volume:

Volume On radio button (ALT+V):

Turns buzzer on.

Volume Off radio button (ALT+O):

Turns buzzer off.

Level drop down list (ALT+L):

Sets level of a buzzer. Allowed range 0...127

Frequency radio button (ALT+Q):

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Turns buzzer off.

Internal Audio Loop group:

Input group:

Next two different values can be selected for input:

Internal radio button (ALT+I):

Turns internal input.

External radio button (ALT+I):

Turns external input.

Headset radio button (ALT+A):

Turns headset input. Note: If Output is not Headset, loop is turned off.

Output group:

Next two different values can be selected for output:

Internal radio button (ALT+T):

Turns internal output.

External radio button (ALT+X):

Turns external output.

Headset radio button (ALT+D):

Turns headset output. Note: If Input is not Headset, loop is turned off.

Loop group:

Next two different values can be selected for loop:

Off radio button (ALT+F):

Turns audio loop off.

On radio button (ALT+N):

Turns audio loop on.

When dialog is closed with the Buzzer Volume is switched always off. Also internal audio loop is turned off.

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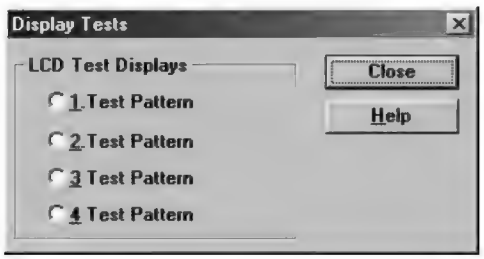
User Interface... command

Activation	Status Bar Text
Alt, E,U	Open User Interface Tests dialog box

Command is used for making display tests in **Display Tests** dialog.



Dialog mode: **modal**

Display Tests dialog has following items:

1. Test Pattern radio button (ALT+1):

   In test display 1 all indicators are displayed and the display is filled with chessboard letters.

2. Test Pattern radio button (ALT+2):

   In test display 2 none of the indicators are displayed and the display is filled with inverse chessboard letters.

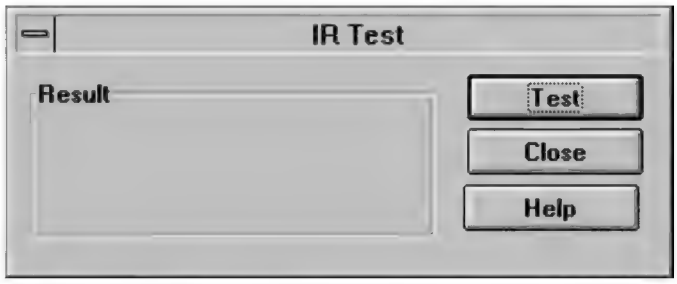
3. Test Pattern radio button (ALT+1):
4. Test Pattern radio button (ALT+1):

When dialog is closed the phone LCD display is cleared.

IR Test... command

Activation	Status Bar Text
Alt, E,I	IR module test

Command is used for making IR module test. Function opens **IR Test** dialog:



Dialog mode: **modal**

IR Test dialog has following items:

Result box:

Result can be OK/FAILED

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Test (ENTER) button:

Starts IR Test.

Close button:

Closes the IR Test dialog.

Vibra Test... command

Activation	Status Bar Text
Alt, E, V	Vibrator module test

This command is used for testing phone's or battery's vibrator. Function opens **Vibra Test** dialog:

Dialog mode: **modal**

Vibra Test dialog has following items:

Vibra Value box:

Edit box where you can enter value from 0 to 255.

Test (ENTER) button:

Starts Vibra Test.

Close button:

Closes the Vibra Test dialog. When dialog box is closed also the vibra test is stopped.

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Software

Product Profile... command

Activation	Status Bar Text
Alt, S,P	Open Product Profile settings dialog box.

Function is used for making product profile settings.

When command is activated the product profile information is read from EEPROM and **Product Profile** dialog is opened.

Dialog mode: **modal**

Product Profile dialog has following items:

Settings list box (ALT+E):

A list where user can select desired setting.

User can toggle setting with following **Options** drop list or by double clicking desired setting in list box.

Options drop list (ALT+O):

List allows user to set options to each settings which are listed in **Settings** list box.

Save(OK) button (ENTER)

Selections are accepted and saved to EEPROM.

Cancel button (ESC)

Selections are ignored and control is returned back to main menu.

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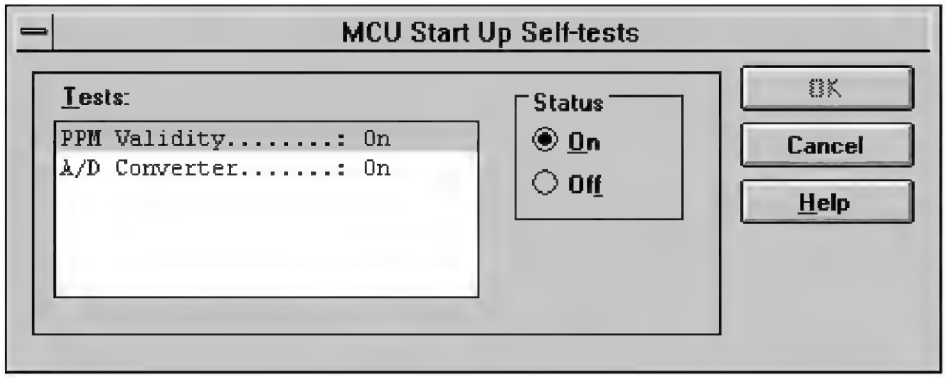
Start Up Self–tests... command

Activation	Status Bar Text
Alt, S,S	Open MCU start Up self–tests dialog box.

Function is used for changing the state of the EEPROM selectable tests in **MCU Start Up Self–tests** dialog.



Dialog mode: **modal**

MCU Start Up Self–tests dialog has following items:

Tests list box (ALT+T):

When dialog is opened, the previous values will be read from the MCU EEPROM and shown on the list box.

Status group:

When radio button **On** is selected, the test will be run every time when automatic start up self–tests are activated (e.g. in power up).

Save button (ENTER)

Selections are accepted and saved to EEPROM. A power up routine is made to phone.

Cancel button (ESC)

Selections are ignored and control is returned back to main menu.

Selectable Start–Up self tests:

PPM Validity

A/D Converter

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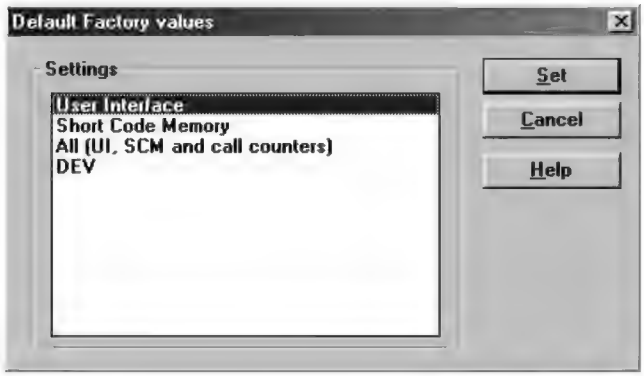
Set Factory Values... command

Activation	Status Bar Text
Alt, S,V	Set factory values

With this selection user can set factory defaults to phone. This selection opens **Default Factory values** dialog.



Dialog mode: **modal**

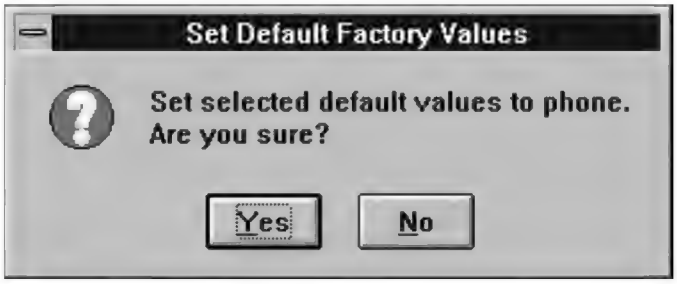
Default Factory Values dialog has following items:

Settings list box:

Contains the selectable factory values.

Set button:

Sets the selected factory value to phone. Before setting software asks confirmation:



Cancel button:

Closes the Default Factory Values dialog.

Available Settings:

User Interface
Short Code Memory
All (UI, SCM and call counters)

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Phone Identity... command

Activation	Status Bar Text
Alt, S,I	Open Phone Identity dialog box for editing

Function is used to edit phone identity. **NOTE**: product code cannot be changed with this dialog, if product code is invalid, e.g. after EEPROM change, change product code first with **Production Data Edit.** With this dialog IMEI or SIM locks may be changed in following manner:

– current phone information is read from phone

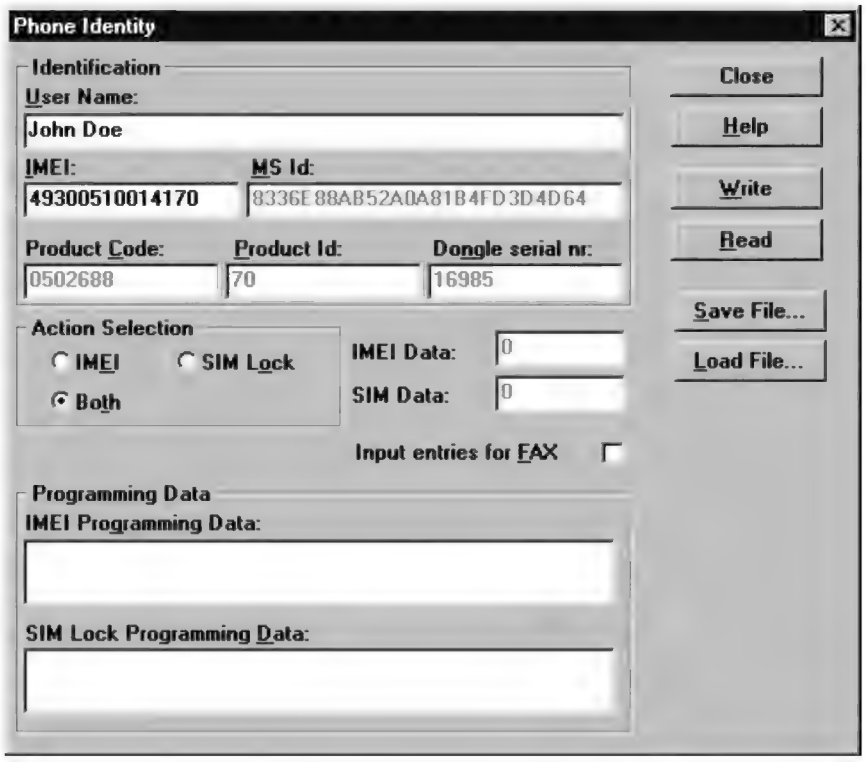
– user edits User Name (and IMEI and Product Code, if they were not read correctly from phone. But if you have to change product code it must be done in the Production Data edit dialog. To edit other fields than User Name and IMEI, Input entries from FAX must be checked)

– dialog information is saved to file, which is sent to secure place where actual programming information may be constructed

– programming information is received from secure place in an other file, which is loaded to dialog

– program checks input values and if they are correct programming information is written to phone (Input values are compared with values read from phone)

Function opens **Phone Identity** dialog.



Dialog mode: **modal**

Phone Identity dialog has following items:

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User Name edit box (ALT+U):

Field where user can enter user identification.

IMEI edit box (ALT+I):

Field where user can enter IMEI value. Field can contain up to 40 digits.This field is automatically filled, if ME is connected to the PC when dialog is loaded.

Product Code edit box (ALT+P):

Field where user can enter Product Code value. This field is automatically filled, if ME is connected to the PC when dialog is loaded. NOTE: Product code cannot be changed with this dialog, if product code is invalid, e.g. after EEPROM change, change product code first with Production Data Edit command.

MS Id edit box (ALT+M):

Field where user can enter MS Id corresponding programming data. This field is automatically filled, if ME is connected to the PC when dialog is loaded.

Product Id edit box (ALT+R):

Field where user can enter Product Id. This field is automatically filled, if ME is connected to the PC when dialog is loaded.

Dongle Serial nr. edit box (ALT+N):

Field where user can enter Product Id. This field is automatically filled, if ME is connected to the PC when dialog is loaded.

IMEI Data edit box:

Field where user can enter IMEI Data entry. This field is automatically filled, when file is loaded or data is saved.

SIM Data edit box:

Field where user can enter SIM Data entry. This field is automatically filled, when file is loaded or data is saved.

IMEI radio button:

File and ME operations contains only IMEI data.

SIM Lock radio button:

File and ME operations contains only SIM Lock data.

BOTH radio button:

File and ME operations contains both SIM Lock and IMEI data.

IMEI Programming Data edit box (ALT+I):

IMEI programming data is read from file or entered by user to this field.

SIM Lock Programming Data edit box (ALT+D):

SIM Lock programming data is read from file or entered by user to this field.

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Input entries for FAX check box (ALT+F):

When checked all fields become editable to allow user to enter values by hand e.g. from FAX.

Close button (ESC):

Cancels all edits and does not save values to phone.

Help button

Opens a help text.

Write button (ALT+W):

Writes programming data to phone. Actions are selected with Action Selection radio button.

Read button (ALT+R):

Reads identification data from phone and shows it in dialog controls. Needed data is selected by Action Selection radio button.

Save File... button (ALT+S):

Writes a file containing data needed by security place application to create needed programming data. File is selected with File Save As dialog.

Load File... button (ALT+L):

Reads a file containing data needed to program selected data. File is selected with File Open dialog.

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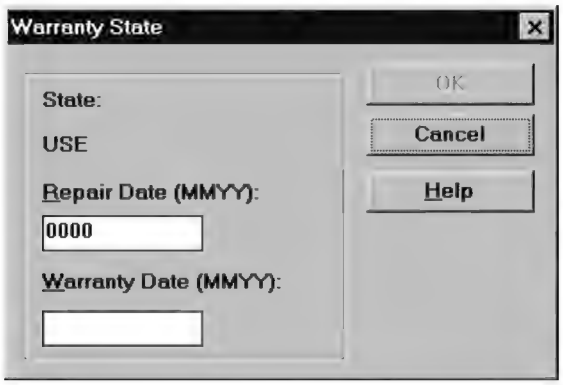
Warranty State... command

Activation	Status Bar Text
Alt, S,W	Open Warranty State dialog box

This command is used to set the warranty state of a phone. When selected application opens **Warranty State** dialog box.



Dialog mode: **modal**

Warranty State dialog has the following items:

State static text:

USE For nomal phones.

DEFECTIVE

For phones which are being swapped. A warranty and other information is transferred to the working phone.

EXCHANGE

For phones which are already repaired from **DEFECTIVE** one.

Repair Date edit box:

When Warranty State is **USE** user can edit repair date. Otherwise field is read only. Format is MMYY, where MM stands for month digits and YY stands for year digits.

Warranty Date edit box:

When state is **DEFECTIVE** user can edit warranty date. When warranty date is saved warranty state will be **EXCHANGE**. Format is MMYY, where MM stands for month digits and YY stands for year digits.

OK button (ENTER):

Closes the dialog box and saves the edited date to the phone. This button is enabled only when phone is Repair Date or Warranty Date is changed.

Cancel button (ESC):

Closes the dialog box and *does not* save the warranty state to the phone.

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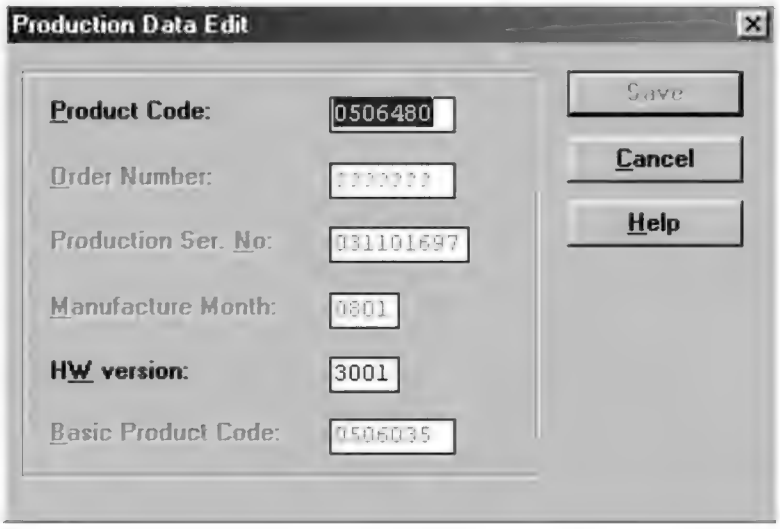
Production Data Edit... command

Activation	Status Bar Text
Alt, S,P	Open Production Data Edit dialog box

This command is used for programming HW version and other production data to phone. Only fields that are editable are validated and written to phone. Function opens the following **Production Data Edit** dialog box.



Dialog mode: **modal**

Production Data dialog has the following items:

Production Code edit box:

User can edit production code.

Order Number edit box (read only):

Displays order number. Order number “???????” is accepted, but not written to phone.

Production Ser. No edit box (read only):

Displays production serial number.

Manufacture Month edit box (read only):

Displays manufacturing month.

HW Version edit box:

User can edit HW version.

OK button (ENTER):

Closes the dialog box and writes HW version to ME.

Cancel button (ESC):

Closes the dialog box and *does not* write HW version to ME.

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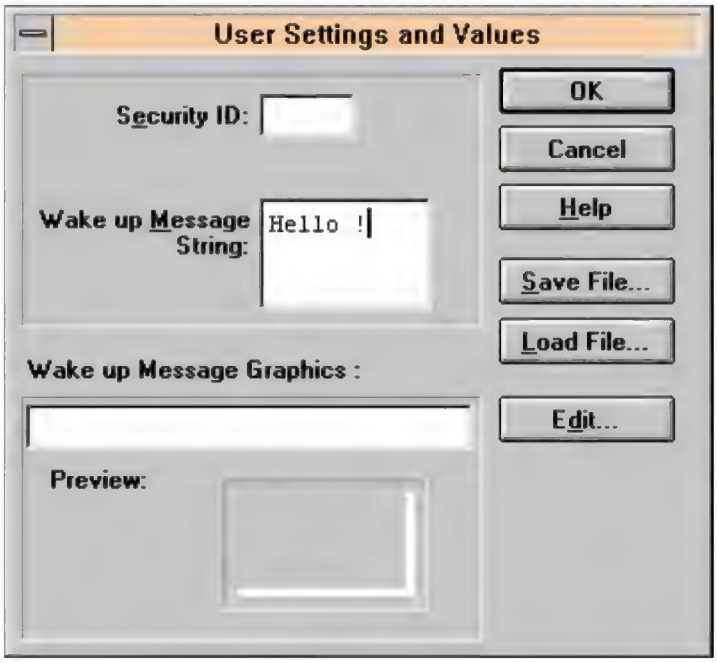
Dealer

The dealer sub menu offers functions for ME settings for dealers.

User Settings... command

Activation	Status Bar Text
Alt, D,U	Open User Setting dialog box

This command is used to edit some user settings. When this command is selected user is asked to read settings from the phone. After answering that dialog following **User Settings and Values** dialog is displayed.



NOTE:
This is a screen example.

Dialog mode: **modal**

User Settings dialog box has following items:

Security ID edit box:

User can change security code in ME.

Preview picture:

Shows graphical Wake up message. This picture is not available, if phone does not support WUG.

Wake up Message Graphics edit box (read only):

Shows name of file picture file loaded. This picture is not available, if phone does not support WUG.

Save File... button (ALT+S):

User can save user settings to file.

Load File button (ALT+L):

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User can load user settings from file.

Edit... button (ALT+D):

Start Windows Paintbrush to edit loaded or saved graphical Wake up message. This picture is not available, if phone does not support WUG.

OK button (ENTER):

Writes user settings to phone.

Cancel button (ESC):

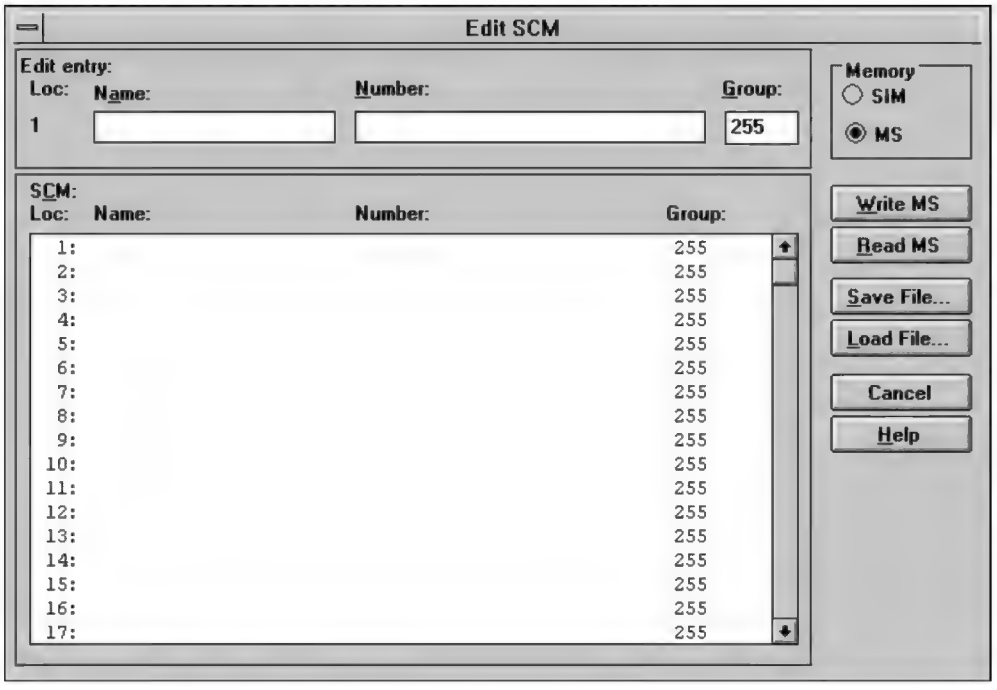
Closes the dialog box

Short Code Memory... command

Activation	Status Bar Text
Alt, S,C	Open Edit SCM dialog box.

This command is used for reading, storing and modifying the SIM/ME SCM values. Before dialog is opened number of memory places is read from phone. If phone does not have SCM in ME Memory selection is disabled and SIM is used as default. If SIM is selected user may be asked to insert PIN and/or wait for SIM to wake up.

Function opens the following **Edit SCM** dialog:



Dialog mode: **modal**

Edit SCM dialog has the following items:

Loc static text:

Displays current location.

Name edit box (ALT+A):

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Edit the Name.

Number edit box (ALT+N):

Edit the Number.

Group edit box:

Edit the Group number.

SCM list box (ALT+C):

List for available names and numbers.

Write MS / Write SIM button (ALT+W):

Write SCM values to phone or SIM and checks the validity of names and numbers.

Read MS / Read SIM button (ALT+R):

Read SCM values from phone or SIM.

Save File... button (ALT+S):

Opens a default Windows **File Save As** dialog and asks filename where to save SCM values.

Load File... button (ALT+L):

Opens a default Windows **File Open** dialog and asks filename where from load SCM values. Checks the validity of names and numbers.

Memory group box:

When memory is selected **SCM** list box size is adjusted to correspond memory size. Adjusting is done either adding empty entries to the end or removing entries from the list box.

SIM radio button:

Selects dialog to edit SIM memory. NOTE: PIN code must be set before editing SIM. During SIM selection user may be asked to insert PIN code and/or wait for SIM to wake up.

MS radio button:

Selects dialog to edit phone memory. This is default when dialog is opened.

When all values are sent and responses received, waiting window is removed and **Edit SCM** is back in control. The waiting state can be broken with **Cancel** (ESC) button. If writing to the ME is broken, only part of the SCM entries in the ME may be changed.

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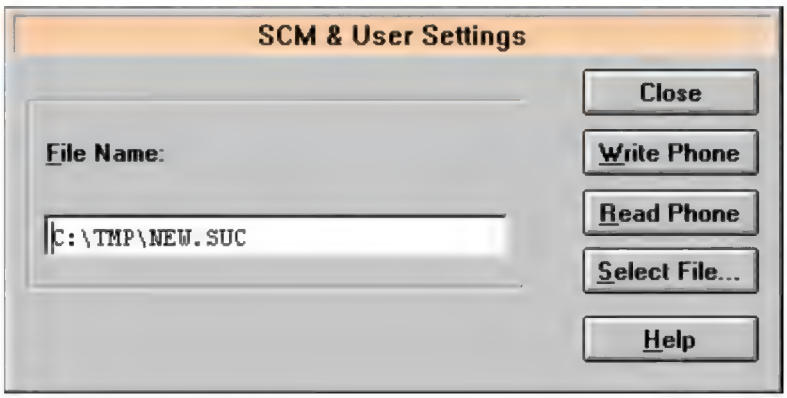
SCM & User Settings... command

Activation	Status Bar Text
Alt, D,M	Open SCM & User settings dialog box.

This command is used to get SCM and user settings from phone to file and vice versa. Following information is loaded/saved with this dialog: all user settings, graphical/text wake up message, SCM, alarms, calendar items and CLI logos and groups. Only values of supported features are saved or loaded. Also SCM in SIM is not saved or loaded.

When data is written or read phone waiting dialog is showed to user.



Dialog mode: **modal**

SCM & User Settings dialog box has following items:

File Name edit field (ALT+F):

User can edit file name or select file with Open File dialog. When dialog is opened, it contains name of the previously saved or loaded file.

Write Phone button (ALT+W):

Loads settings from file and writes them to phone.

Read Phone button (ALT+R):

Reads settings from phone and writes them to file.

Select File button (ALT+S):

Opens Open File dialog, with which user can select the file, that contains the data to be loaded to ME or file to which data is saved from ME. If user selects OK button, the name of selected file is copied to File Name edit field.

Close button (ESC):

Closes the dialog box.

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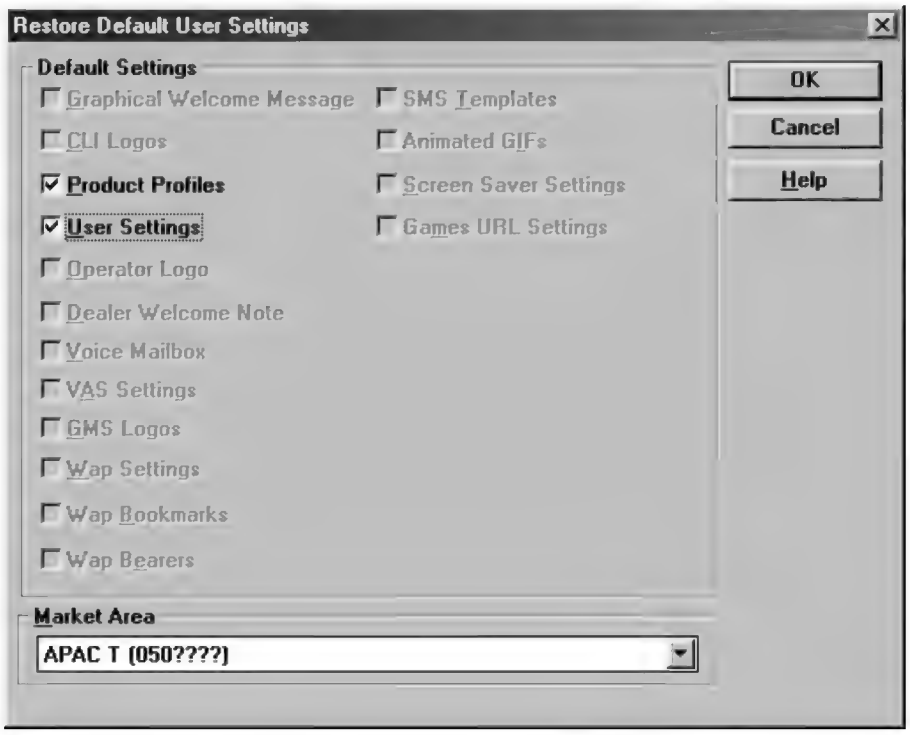
Restore User Defaults... command

Activation	Status Bar Text
Alt, D,R	Open Restore Default User Settings.

This command is used to restore Default User Settings, if they have degenerated. Dialog may be opened from menu, or is opened automatically, when loading or saving user settings fails or is skipped during flashing (see Flash Phone... command). The dialog is also opened after full factory set.

Default settings are loaded from files in product specific subdirectory of WinTesla directory e.g. for NSM–X this directory could be *c:\wintesla\nsm–X*. Into these directories user should unpack all flash packages. Market areas and corresponding files are described in INI–file in product specific subdirectory e.g. for NSM–X this file would be *c:\wintesla\nsm–X\nsm–X.ini*. INI–file is common to all flash packages, but market areas are added to Market Area list, when new flash packages are unpacked to product specific subdirectory.

Selecting Restore User Defaults opens following Restore Default User Settings dialog.



NOTE: This is a screen example. Actually enabled settings may differ.

Dialog mode: **modal**

Restore Default User Settings dialog box has following items:

Default Settings static text:

User can check one or more check boxes to restore corresponding defaults from file to ME. Check boxes are disabled/

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enabled according to settings available in selected Market Area.

Graphical Welcome Message check box (ALT+G):

When checked user selects to restore default graphical welcome message.

CLI Logos check box (ALT+C):

When checked user selects to restore default CLI logos.

Product Profiles check box (ALT+P):

When checked user selects to restore default product profiles.

User Settings check box (ALT+U):

When checked user selects to restore default user settings.

Operator Logo check box (ALT+O):

When checked user selects to restore default operator logo.

Dealer Welcome Note check box (ALT+D):

When checked user selects to restore default dealer welcome note.

Voice Mailbox check box (ALT+V):

When checked user selects to restore default voice mailbox number.

Market Area drop list (ALT+M):

User selects market area of the phone.

Write Phone button (ALT+W):

Loads settings from files and writes them to phone.

Close button (ESC):

Closes the dialog box.

Set UI/DEV Default Values... command

Activation	Status Bar Text
Alt, D,V	Reset phone to UI and SCM factory settings

After selection application asks confirmation: “Are you sure you want to set UI/DEV to factory settings?”. If Yes is answered, default settings are resetted to phone.

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Operators Settings... command

Activation	Status Bar Text
Alt, D,O	Open Operator Settings dialog.

This command is used to set operator settings This selection opens following **Operator Settinngs** dialog.

Dialog mode: **modal**

Operator Settings dialog box has following items:

Settings group:

Country Code edit box (ALT+C):

User can edit country code (3 or 4 digits).

Network Code edit box (ALT+N):

User can edit network code (2 digits).

Operator Name edit box (ALT+O):

User can edit operator name (10 characters).

Save button (ENTER, ALT+S):

Saves settings to phone and closes dialog.

Reset button (ALT+R):

Clears operator settings form phone and closes dialog.

Cancel button (ESC):

Closes the dialog box and do not save settings to phone.

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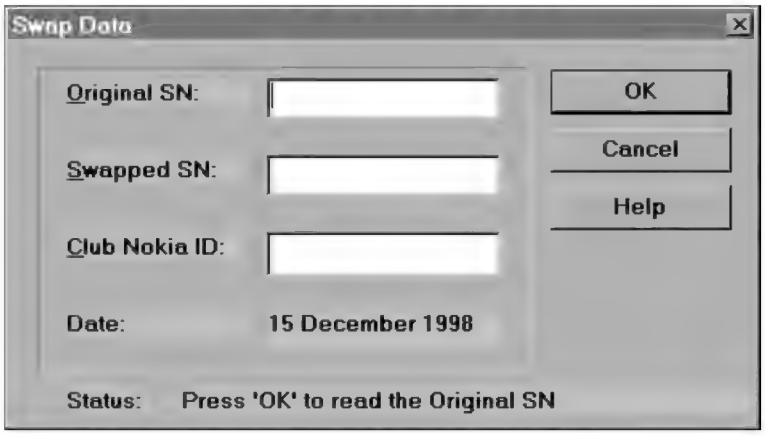
IWR Swap... command

Activation	Status Bar Text
Alt, D,I	Open IWR Swap dialog.

This command is used to swap serial numbers of two phones. This selection opens following **IWR Swap** dialog.



Dialog mode: **modal**

IWR Swap dialog box has following items:

Original SN: edit box (ALT+O):

Edit box where the original serial number is shown

Swapped SN: edit box (ALT+S):

Edit box where the swapped serial number is shown

Club Nokia ID: edit box (ALT+C):

Edit box where the Club Nokia ID is shown

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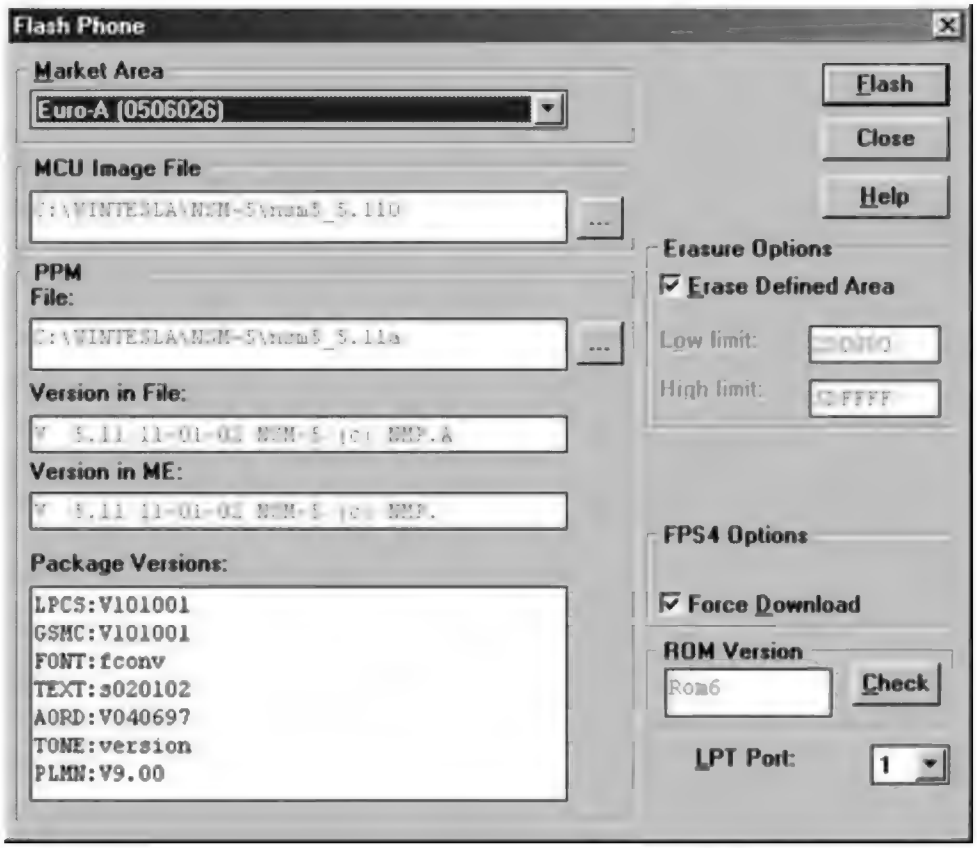
Flash Phone... command

Activation	Status Bar Text
Alt, D,F	Open Flash Phone dialog box.

This command is used for flashing new software into the phone. When flashing dead phone, user may be asked to select phone type. If more than one phone is flashed without closing dialog, then user **must** press **Check** button after phone has been changed.

Selection opens the following **Flash Phone** dialog box. When flashing is started, waiting windows is showed telling the user estimated flashing time. Flashing files are delivered in product and market area specific flash packages. These packages should be unpacked to product specific sub-directory of WinTesla directory e.g. *C:\WINTESLA\NSM–X* for NSM–X flash. This directory will then contain product specific INI–file e.g. NSM–X.INI in which different market areas and files are described.



NOTE: This is a screen sample, actual information may differ.

Dialog mode: **modal**

Flash Phone dialog box has following items:

Market Area group:

Drop down list box (ALT+M):

User can select correct market area for phone. With this selection correct image and PPM files are loaded to edit fields. Usually this is the correct way to select files to be flashed.

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MCU Image File group:

Edit field (read only):

Displays path of image file to be flashed.

... button:

Opens Open File dialog, with which user can select an image file to be flashed to ME. If user selects OK button, the name of selected file is copied to Flash Image edit field. Usually you should use Market Area list box to select Image file.

PPM group:

Edit field (read only):

Displays path of PPM package file to be flashed.

... button:

Opens Open File dialog, with which user can select a PPM package file to be flashed to ME. If user selects OK button, the name of selected file is copied to PPM Image edit field. Usually you should use Market Area list box to select PPM file.

Version in File edit field (read only):

MCU SW version string of the PPM package.

Package Versions edit field (read only):

Lists the file versions of PPM package.

Flash button (ALT+F):

Starts flashing selected files to phone. Before flashing asks, does user want to save all user settings to file (and load them after flashing). If reading user settings to ME or writing them to ME failed, Restore Default User Settings dialog is opened and user can restore default settings to phone.

NOTE: If settings are saved but flashing fails or for some other reason setting are not loaded back to phone, the saved settings can be loaded phone later. When settings are saved they are also copied to files which names are generated from phone PSN. If settings are not loaded back to phone after flashing those files are left and found by application when phone is flashed next time. After successful loading to phone files are removed.

Close button (ESC):

Closes the dialog box and *does not* start flashing.

Erasure Options group:

Erase Defined Area check box:

If it is checked, prommer erases from phone EEPROM area defined with **Low limit** and **High limit** fields. If it is not checked only new blocks are erased from phone EEPROM. If values in

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fields are not valid, then check box is disabled. Checkbox state is read from flash pack ini–file, from entry **EraseDefinedArea**.

Low limit edit box (read only):

Hexadecimal value defining low erase limit, value should be plain hexadecimal without any prefix. Field value is read from flash pack ini–file, from entry **LowEraseLimit**.

High limit edit box (read only):

Hexadecimal value defining high erase limit, value should be plain hexadecimal without any prefix. Field value is read from flash pack ini–file, from entry **HighEraseLimit**.

Force Download check box (ALT+D):

Forces downloading of selected PPM file to a prommer even, if it already exists there. Can be used to replace a corrupted file in a prommer with a proper one.

ROM Version Group:

ROM Version edit box:

Shows rom version of flashed phone.

Check button (Alt+A):

Checks connected phone, reads MCU SW and ROM version from the phone and loads market areas. If application cannot detect ROM version, user is shown **ROM Version** selection dialog. If application cannot detect phone type, user is shown **Phone Type Selection** dialog.

LPT Port list box (ALT+L):

User can select parallel port to be used when flashed.

During flashing status dialog is showed. After phone is flashed current time in PC is set to phone and user is asked to check that the time is correct. If flashing succeeded “Flashing completed!” message is shown to user, if flashing failed “Flashing failed” message is shown instead.

After flashing phone several self–test are checked or run. If some of those fail, then Flash Id, factory sets or user settings are not written to phone. For example if SW Version fails, then MCU SW version does not match phone HW and user should flash MCU SW and PPM for correct ROM version.

Phone Type Selection dialog

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NOTE: This is a screen sample, actual information may differ.

Dialog mode: **modal**.

Phone Type Selection dialog has following items:

Phone Type group:

List box:

User can select phone type.

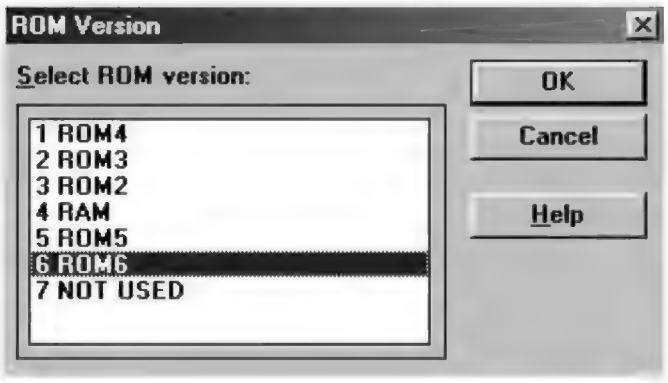
OK button (ENTER):

User accepts selected phone type.

Cancel button (ESC):

Phone type selection is cancelled and operation is aborted.

ROM Version dialog



NOTE: This is a screen sample, actual information may differ.

Dialog mode: **modal**

ROM Version dialog has following items:

Select ROM version group:

List box:

User can select ROM version of phone.

OK button (ENTER):

User accepts selected ROM version.

Cancel button (ESC):

ROM version selection is cancelled and operation is aborted.

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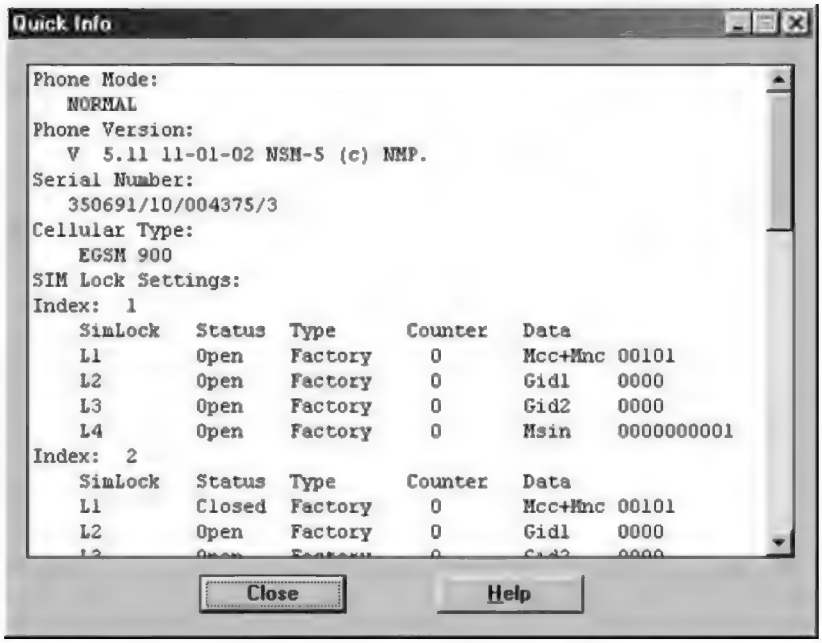
View

Quick/RF Info... command

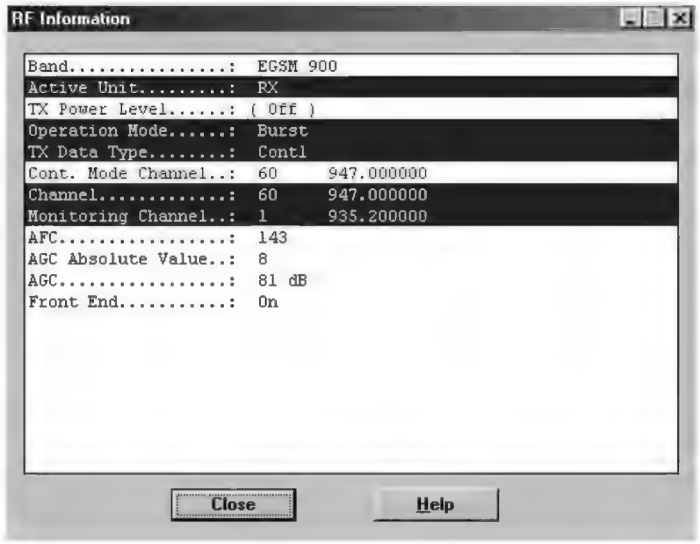
Activation	Status Bar Text
Alt, V,Q	View Quick/RF information.

If phone is in *normal* mode following **Quick Info** is shown:



Dialog mode: **modeless**

If phone is in local mode following **RF Information** is shown. Information is shown in a modeless dialog which may be left open during other operations. It is also updated when ever needed.



Dialog mode: **modeless**

Selections show what data is currently updated by PC.

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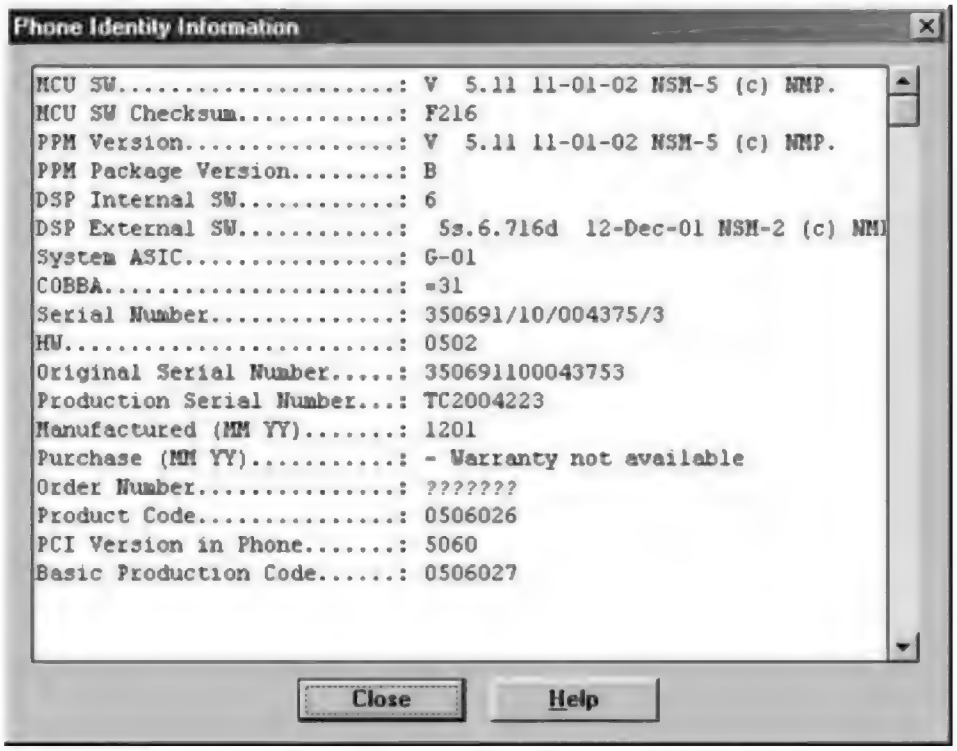
Phone Information... command

Activation	Status Bar Text
Alt, V,P	View Phone Identity.

Command opens **Phone Identity Information** dialog, which shows identification information. Information is shown in a modeless dialog which may be left open during other operations. It is also updated when ever needed.


Phone Identity Information
MCU SW.....: V 5.11 11-01-02 NSM-5 (c) NMP.
MCU SW Checksum.....: F216
PPM Version.....: V 5.11 11-01-02 NSM-5 (c) NMP.
PPM Package Version.....: B
DSP Internal SW.....: 6
DSP External SW.....: 5s.6.716d 12-Dec-01 NSM-2 (c) NM
System ASIC.....: G-01
COBBA.....: =31
Serial Number.....: 350691/10/004375/3
HW.....: 0502
Original Serial Number.....: 350691100043753
Production Serial Number...: TC2004223
Manufactured (MM YY).....: 1201
Purchase (MM YY).....: - Warranty not available
Order Number.....: ???????
Product Code.....: 0506026
PCI Version in Phone.....: 5060
Basic Production Code.....: 0506027
Close
Help

Dialog mode: **modeless**

Initialization file

The After Sales Software has an initialisation file which has extension .INI. Initialisation file is TESLA.INI which includes all next selections (on mentioned menus or dialogs) and parameters:

Common Settings:

[STARTUP]
Mode=0 // 0 = normal mode, 1 = local mode, 2 = do nothing

RF Controls dialog

Active Unit (Active Unit=)

TX Power Level (TX Power Level=)

Operation Mode (Operation Mode=)

TX Data Type (TX Data Type=)

Continuous Mode Channel (Cont Mode Channel=)

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Channel (Channel=)

Monitoring Channel 1 (MonitoringChannel=)

AGC dB value (AGC=)

AGC Absolute Value (AGCAbsolute=)

Front End (FrontEnd=)

Call Simulation dialog

Monitoring Channel 2 (Monitoring Channel 2 =)

Monitoring Channel 3 (Monitoring Channel 3 =)

Monitoring Channel 4 (Monitoring Channel 4 =)

Monitoring Channel 5 (Monitoring Channel 5 =)

Monitoring Channel 6 (Monitoring Channel 6 =)

All selections and parameters which are not same as in the RF Controls menu.

TX Power Tuning dialog ([TX Power Tuning])

TX power coefficients

TX I/Q Tuning dialog ([TX I/Q Tuning])

TX I/Q

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Tuning Instructions

General

All tuning operations are carried out using the service software. The service software turns the phone into the locals mode, in which the phone can be outwardly controlled via the MBUS interface.

Tuning is based on the software communicating with the D/A and A/D converters of the phone. In some instances the phone processor will also calculate the required correction parameter.

The tuning values of the phone reside on the EEPROM. The contents of the EEPROM can be read by the service software and saved as a file. This is advisable when there is need to retain that information, e.g. in view of replacement of the circuit. The program also enables writing the default parameters on the EEPROM, in which case all tuning steps should be carried out.

During tuning, proceed as follows:

- Take care not to damage sensitive measuring instruments with excessive RF power.
- Carry out all tuning steps in the shortest possible time to avoid excessive heating of RF units.
- Perform all tuning steps in the order presented.
- Never try to mask a fault by tuning it out!

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Required Equipment

- PC with service software; see separate section for instructions on installation and use.
- Service accessories; see equipment setup pictures.
- Multimeter or DVM.
- GSM radio telephone test station or separate measuring equipment as follows:
    - RF generator
    - pulse power meter
    - spectrum analyzer
    - attenuator and branching unit

Equipment Setup

Caution: Make sure that you have switched off the PC and the printer before making connections !

Caution: Do not connect the PKD–1 key to the serial port. You may damage your PKD–1 !

Attach the protection key PKD–1 to parallel port one (25–pin female D–connector) of the PC. When connecting the PKD–1 to the parallel port be sure that you insert the PC end of the PKD–1 to the PC (male side). If you use a printer on parallel port one, place the PKD–1 between the PC and your printer cable.

Next connect the M2BUS service cable, DAU–9S, to the serial port (RS–232) of the computer. Attach one end of the service cable to the PC serial port and the other end to the service box, JBU–6. For servicing the phone with the covers in place the service box should always be used.

When the phone covers are removed the jigs should be used.

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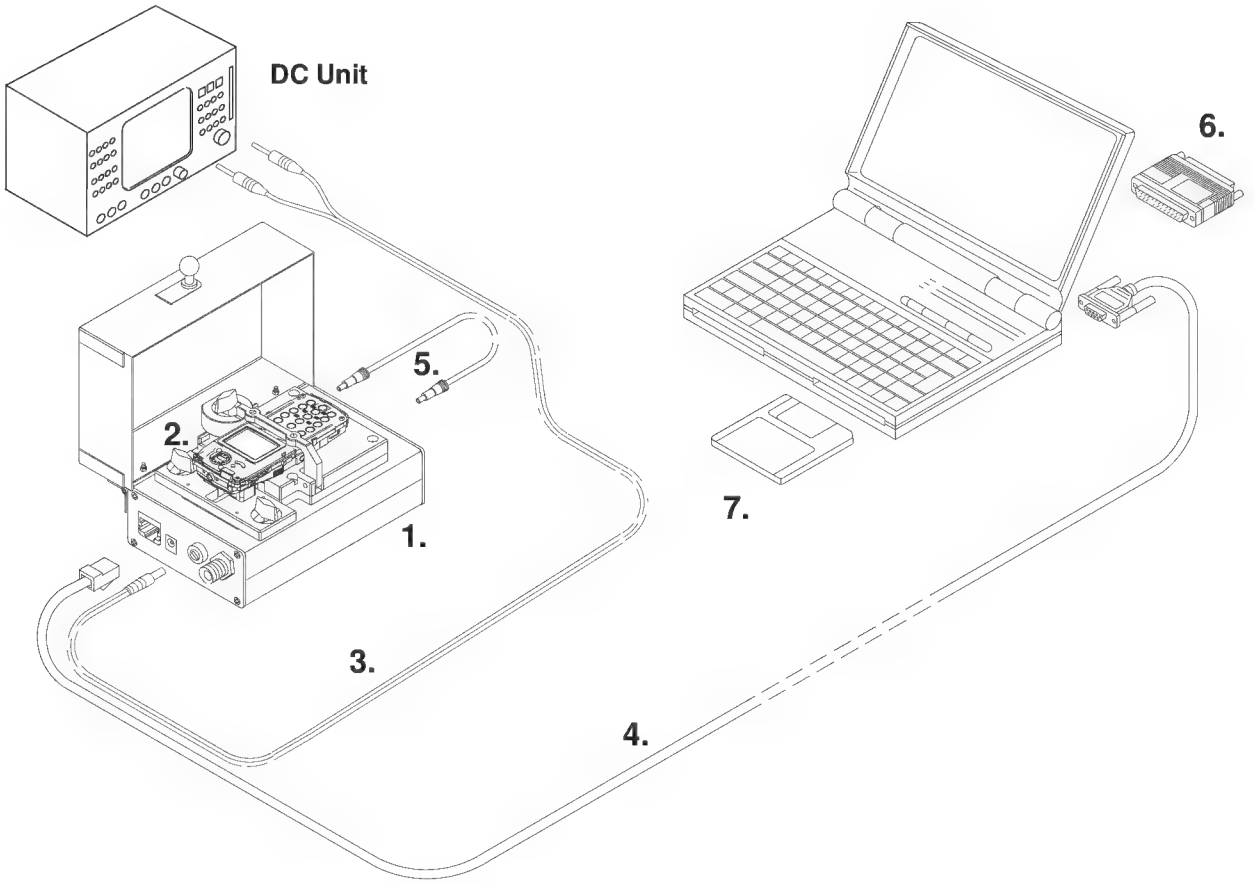
Equipment Setup for Testing



Item:	Service accessory:	Product code:
1	Service Box JBU–6	0770153
2	RF Adapter RAF–5 for JBU–6	0775302
3	DC Power Cable PCS–1	0730012
4	Service MBUS Cable DAU–9S	0730108
5	DC–DC Cable SCB–3	0730114
6	Software protection key PKD–1	0750018
7	Service SW diskette 3.5” for WinTesla Service SW diskette 3.5” for NSM–5 Flash SW packages on CD global	0774071 0774080 0775314

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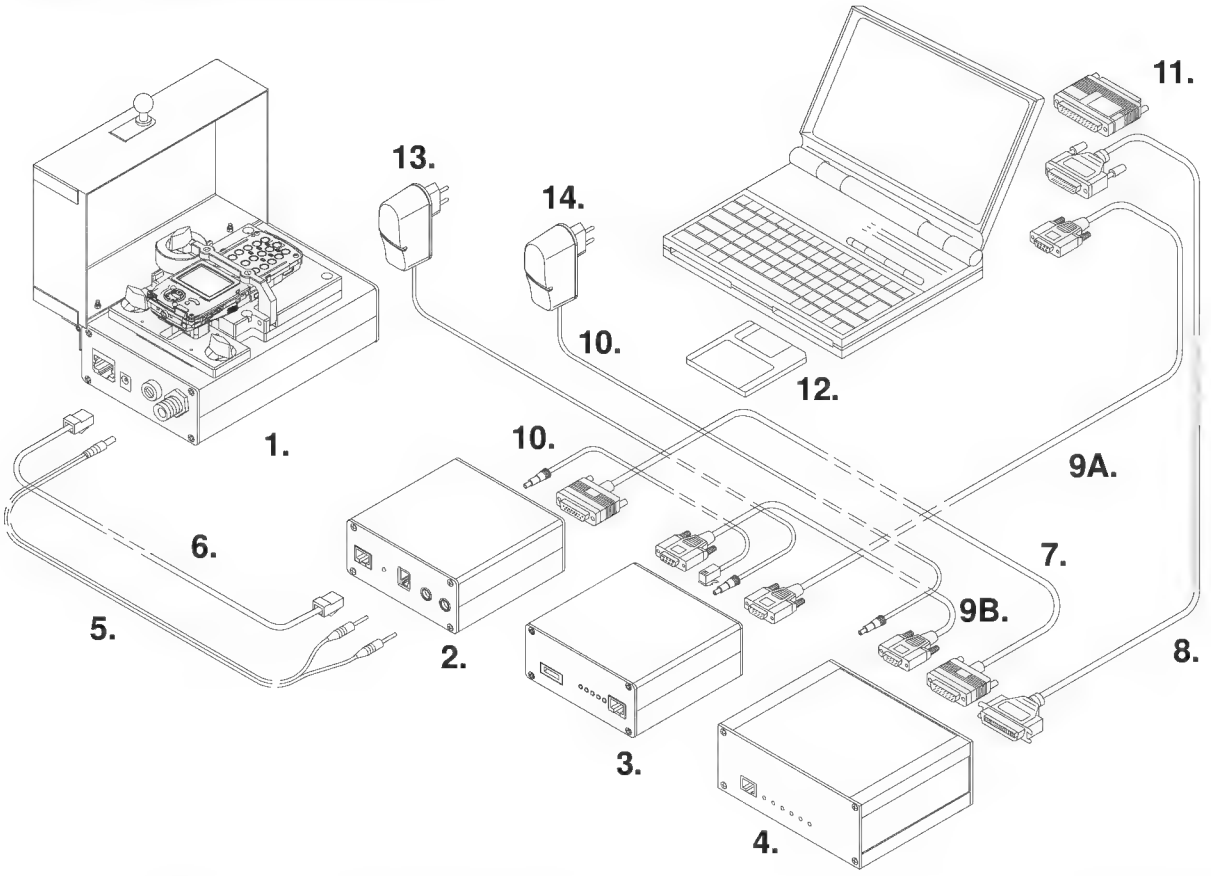
Flash Concept with JBU–6



Item:	Service accessory:	Product code:
1	Service Box JBU–6	0770153
2	Flash Loading Adapter FLA–7	0080326
3	Flash Security Box TDF–4	0770106
4	Prommer FPS–4S	0085095
5	DC Power Cable PCS–1 for JBU–6	0730012
6	Service Cable XMS–3	0730174
7	D15 – D15 Cable AXS–5	0730091
8	Printer Cable (Included in FPS–4 sales pack)	0730029
9A	D9 – D9 Cable AXS–4 (Included in FPS–4 sales pack)	0730090
9B	D9 – D9 Cable AXS–4	0730090
10	DC Cable AXD–1	0730144
11	Software protection key PKD–1	0750018
12	Service SW diskette 3.5” for WinTesla	0774071
	Service SW diskette 3.5” for NSM–5	0774080
	Flash SW packages on CD global	0775314
13, 14	Travel Charger ACH–6E (Euro)	0270381
	Travel Charger ACH–6U (USA/Japan)	0270382
	Travel Charger ACH–6X (UK)	0270380

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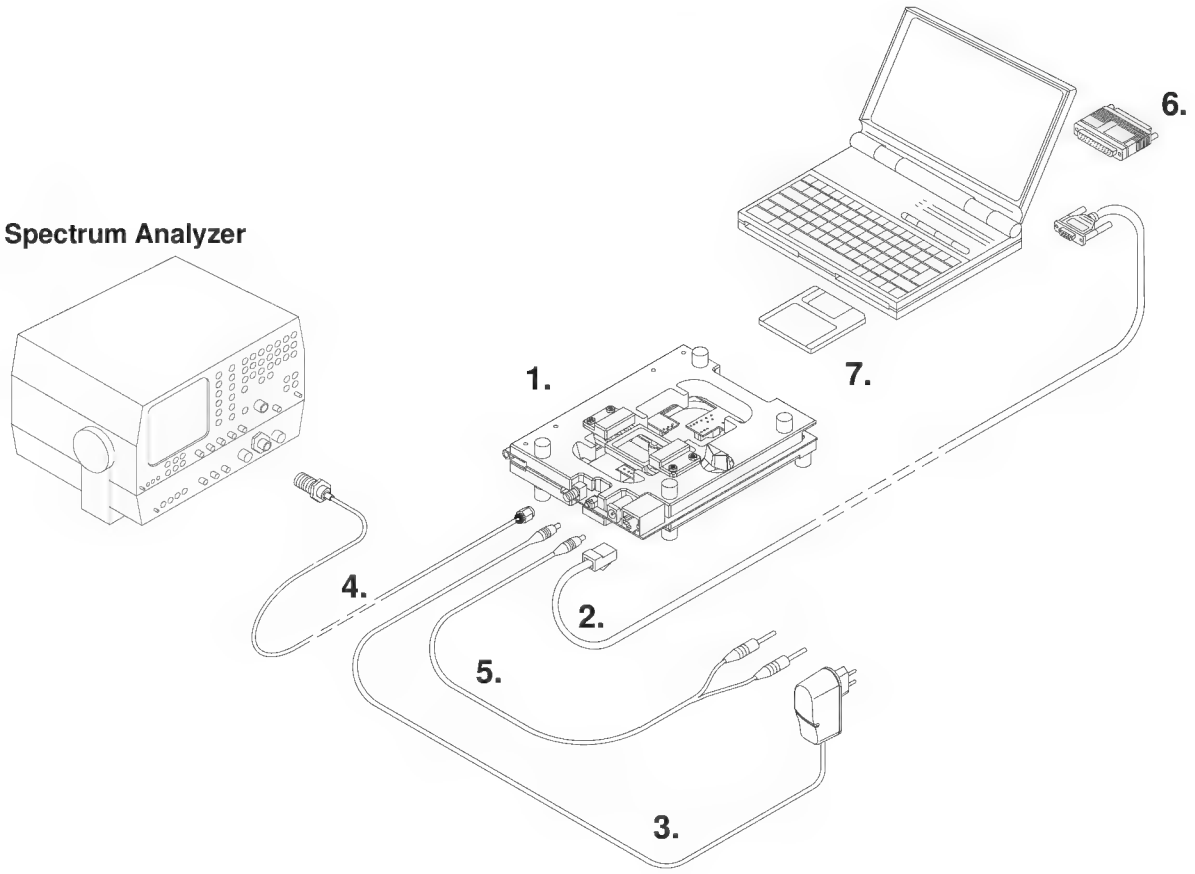
Testing Without Covers – Using Test–frame MJS–9



Item:	Service accessory:		Product code:
1	Module Jig MJS–9*		0770154
2	Service MBUS Cable DAU–9S		0730108
3	ACP–8 Travel Charger		
	Korea plug 90–264 Vac	ACP–8K	0273111
	China plug 90–264 Vac	ACP–8C	0675211
	Australia plug 90–264 Vac	ACP–8A	0271637
4	RF Antenna Cable XRF–1		0730085
5	DC Power Cable PCS–1		0730012
6	Software Protection Key PKD–1		0750018
7	Service SW diskette 3.5” for WinTesla		0774071
	Service SW diskette 3.5” for NSM–5		0774080
	Flash SW packages on CD global		0775314

*) The nominal operating voltage for MJS–9 is 8.0 V.
The supply voltage for MJS–9 must never exceed 15.0 V

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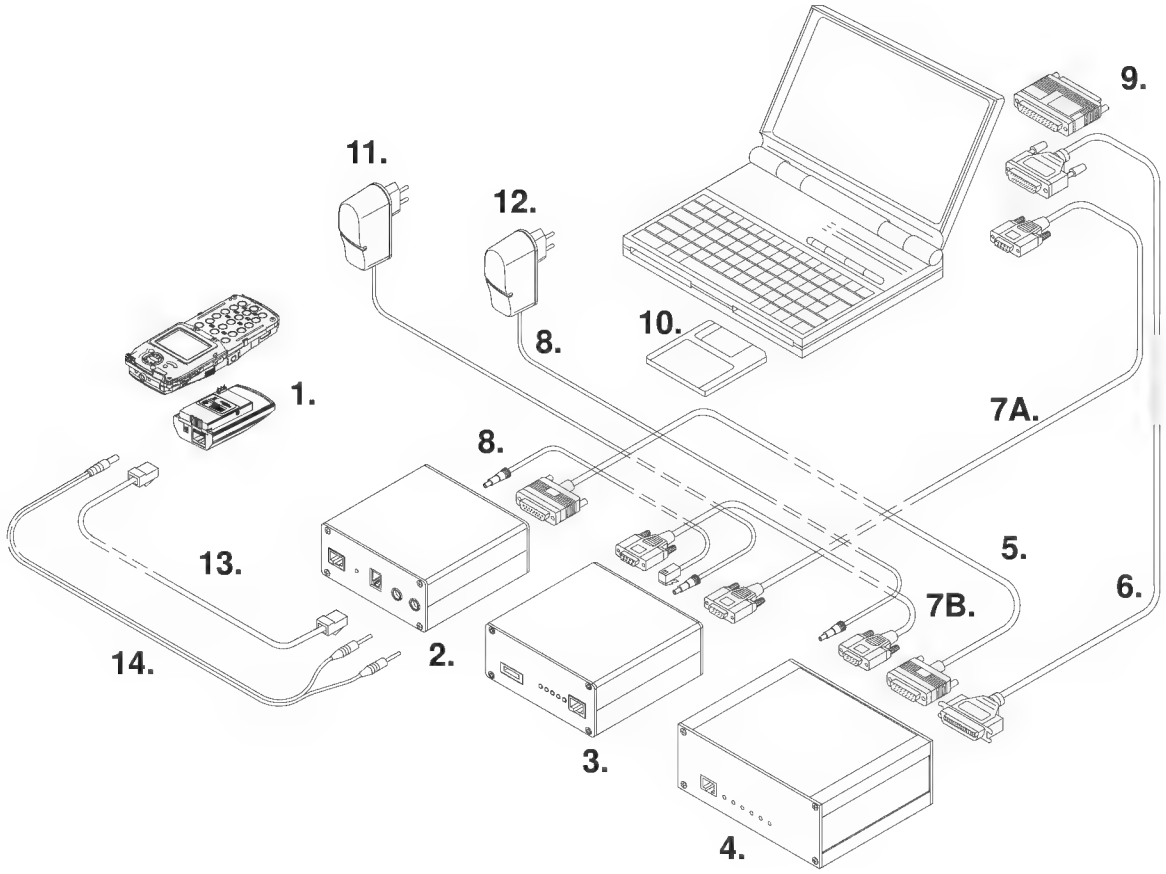
Flashing With FLA–10



Item:	Service accessory:	Product code:
1	Service Flash Adapter FLA–10 (Sales Pack)	0081346
2	Flash Loading Adapter FLA–7	0080326
3	Flash Security Box TDF–4	0770106
4	Prommer FPS–4S	0085095
5	D15 – D15 Cable AXS–5	0730091
6	Printer Cable (Included in FPS–4 sales pack)	0730029
7A	D9 – D9 Cable AXS–4 (Included in FPS–4 sales pack)	0730090
7B	D9 – D9 Cable AXS–4	0730090
8	DC Cable AXD–1	0730144
9	Software protection key PKD–1	0750018
10	Service SW diskette 3.5” for WinTesla	0774071
	Service SW diskette 3.5” for NSM–5	0774080
	Flash SW packages on CD global	0775314
11, 12	Travel Charger ACH–6E (Euro)	0270381
	Travel Charger ACH–6U (USA/Japan)	0270382
	Travel Charger ACH–6X (UK)	0270380
13	Service Cable XMS–3 (XCM–5 included in FLA–7 Sales Pack)	0730174
14	DC Power Cable FLC–2 (Included in FLA–10 Sales Pack)	0730012

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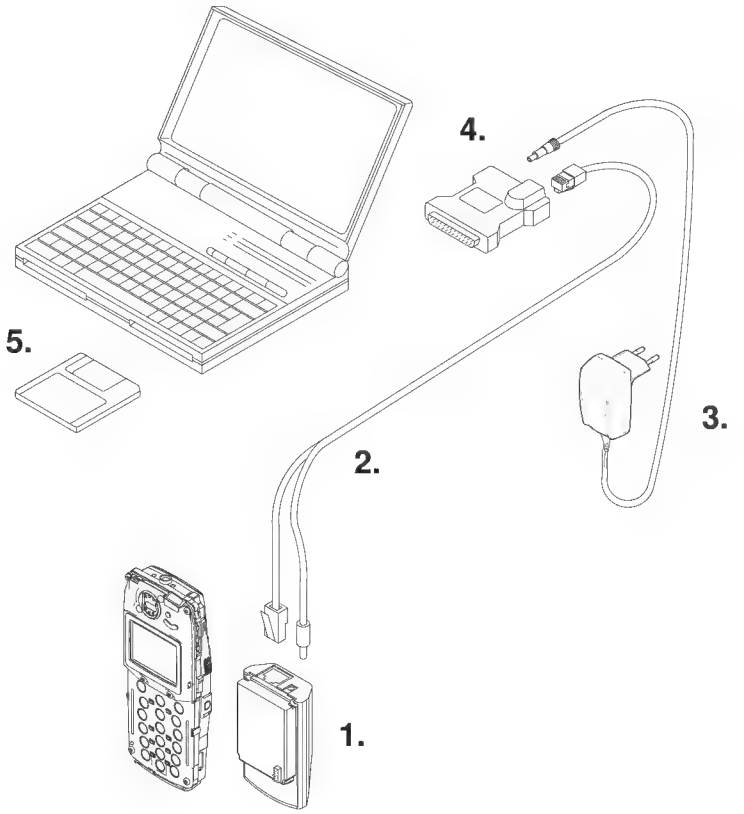
POS Flash Concept with FLA–10



Item:	Service accessory:		Product code:
1	Flash Loading Adapter FLA–10		0081346
2	Service Cable XCS–1		0730218
3	Travel Charger ACP–8		
	China plug 90–264 Vac	ACP–8C	0675211
	Korea plug 90–264 Vac	ACP–8K	0273111
	DIN plug (E&A) 90–264 Vac	ACP–8E	0272169
4	FLS–4 POS Reflashing Tool	APAC	0081481
		Europe/Africa	0081483
6	Service SW diskette 3.5” for WinTesla		0774071
	Service SW diskette 3.5” for NSM–5		0774080
	Flash SW packages on CD global		0775314

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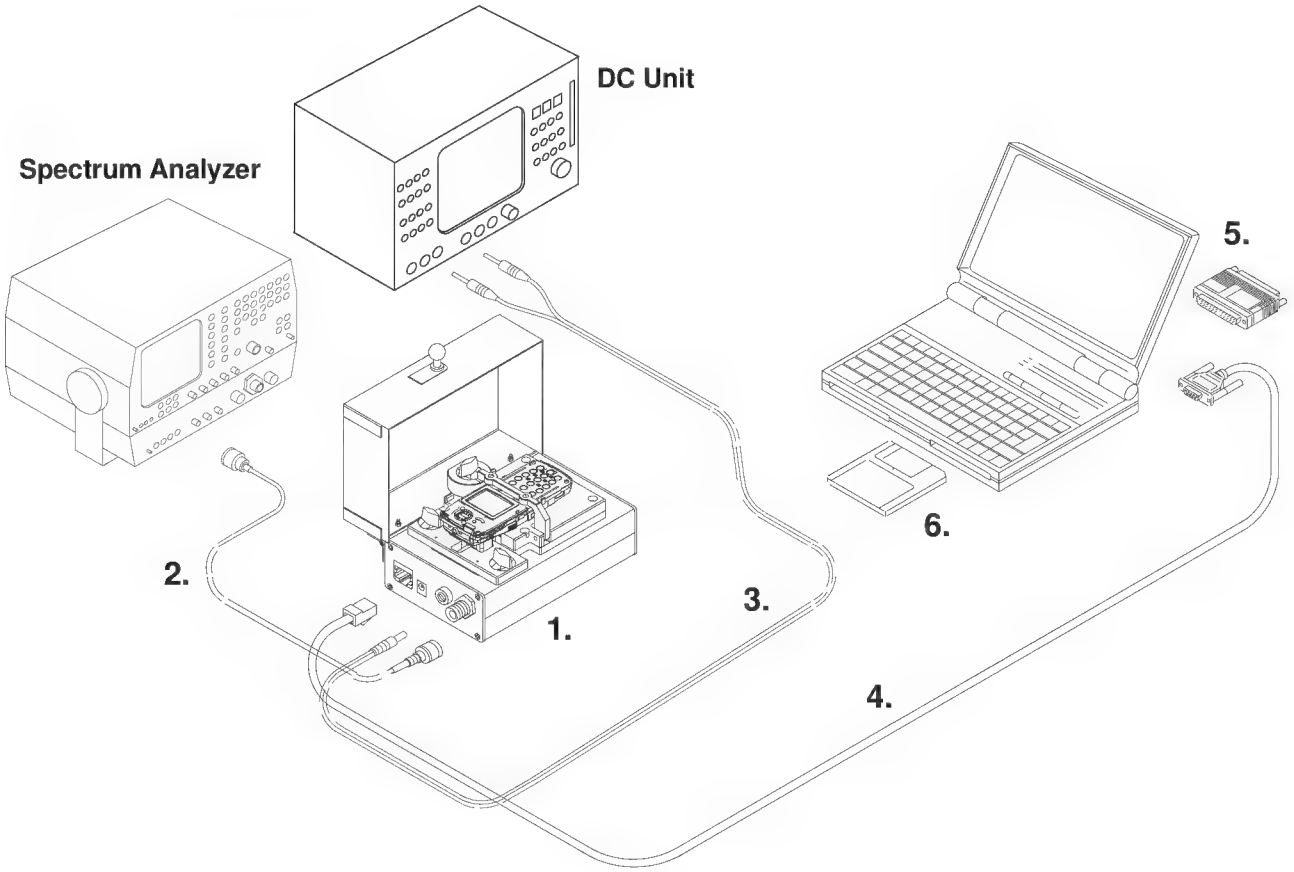
JBU–6 RF Measurement Concept



Item:	Service accessory:	Product code:
1	Service Box JBU–6	0770153
2	RF Cable XRS–3	0730184
3	DC Power Cable PCS–1	0730012
4	Service MBUS Cable DAU–9S	0730108
5	Software protection key PKD–1	0750018
6	Service SW diskette 3.5” for WinTesla Service SW diskette 3.5” for NSM–5 Flash SW packages on CD global	0774071 0774080 0775314

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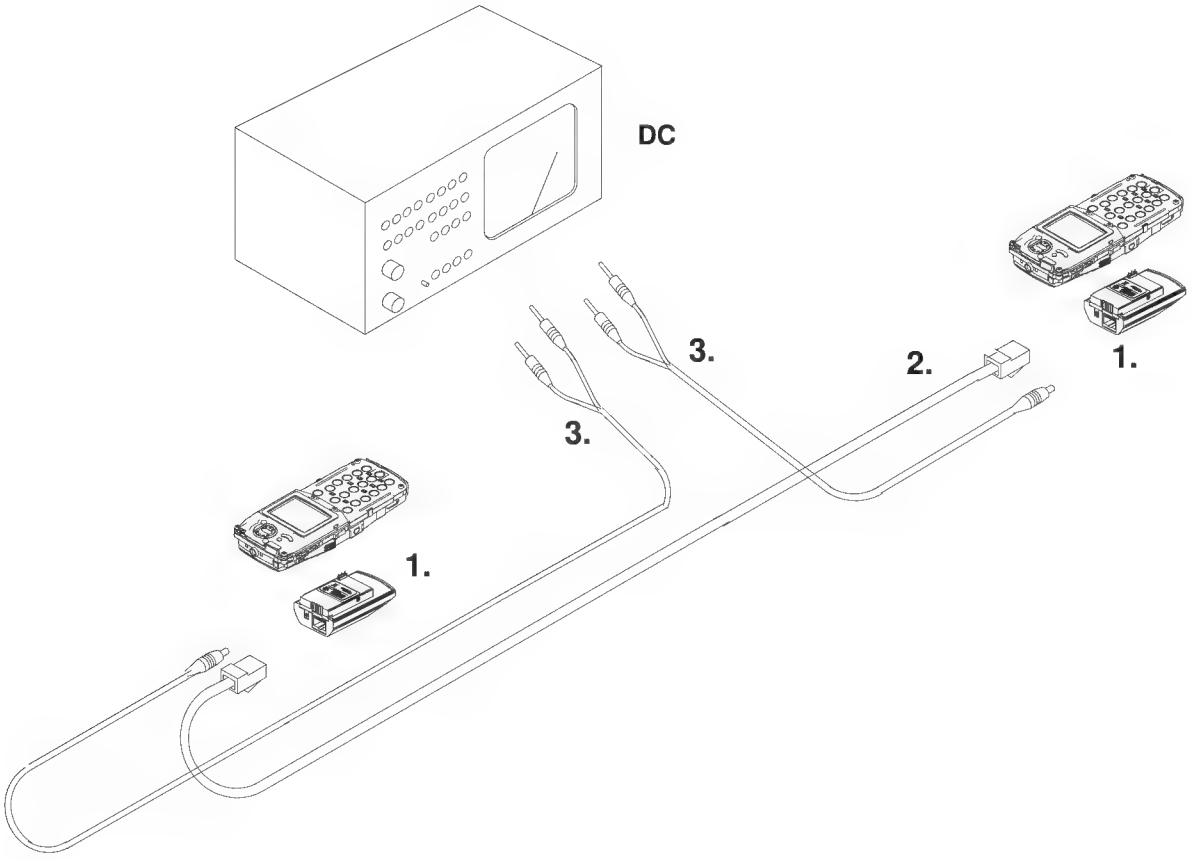
Warranty Transfer



Item:	Service accessory:	Product code:
1	Flash Loading Adapter FLA–10	0081346
2	Service Cable XMS–3	0730174
3	DC Power Cable FLC–2	0730185

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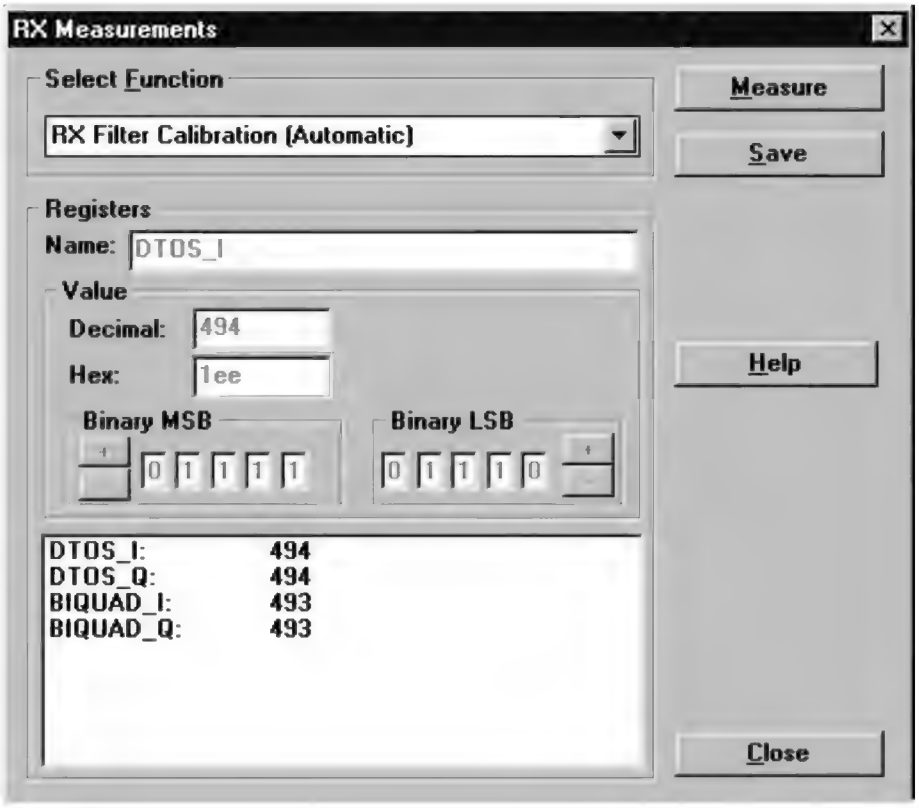
Tuning Steps

IMPORTANT: It is recommended to use adapter RAF–5 with JBU–6 when the phone is tuned because of the galvanic (direct) connection to the phone.

1. RX Filter Calibration

BB–filter tuning is fully internal operation. External signal generators etc. are not needed, only command for phone to execute filter calibration procedure.

NOTE: RX Filter Calibration is needed when N505 has been changed.



2. RX Calibration (AGC + AFC)

Procedure

Follow the steps described in chapter "Service Software Instructions" section "RX calibration... command".

The measurement is done in five steps: 1. User is requested to put signal generator to high input level (read from .INI file).

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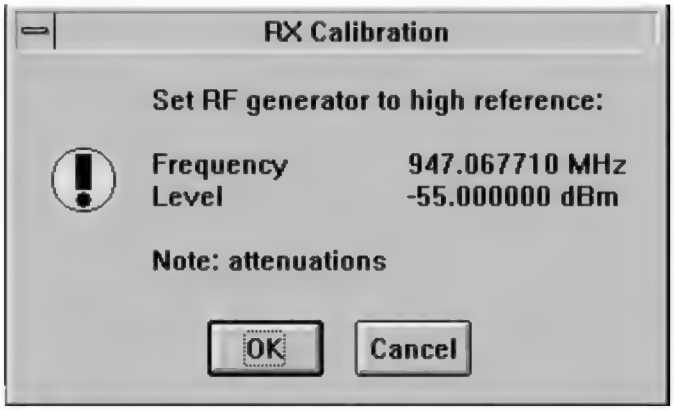
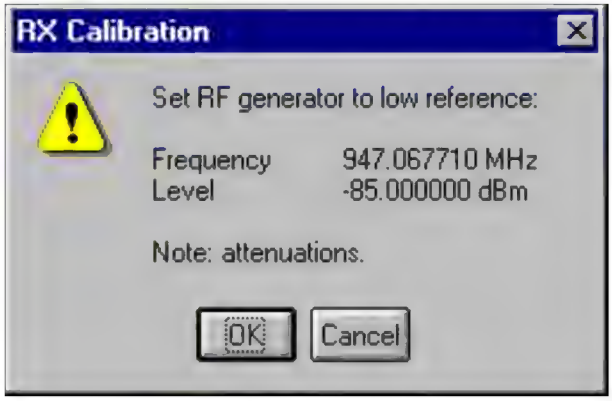


2. Measurement with high input level is executed

3. User is requested to put signal generator to low input level (read from .INI file).



4. Measurement with low input level is executed

5. The **RX Calibration** dialog will be updated when previous steps are done.

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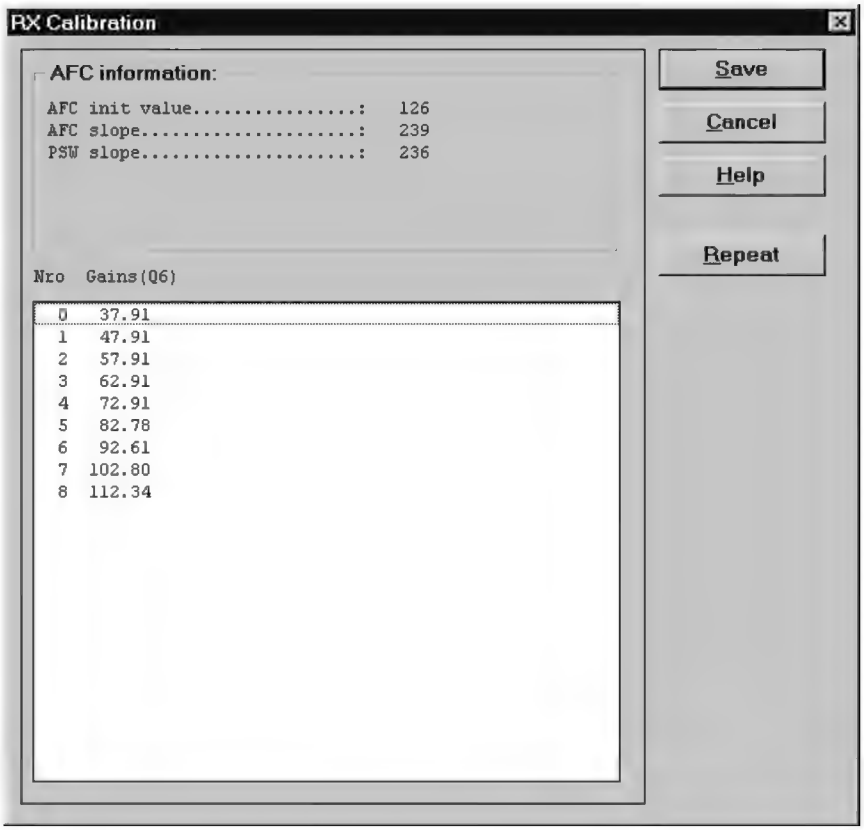

Software reports the following:

AFC init value
AFC slope
PSW slope
Gain step values

Limits for the reported values

If everything went well the reported values should **approximately** be the following:

Parameter	Low limit	High limit
AFC init value	–200	200
AFC slope	135	345
PSW slope	For information	

Gain step values	EGSM (nominal)	PCN (nominal)
0	37	28
1	47	38
2	57	48
3	62	53
4	72	63
5	82	73

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Gain step values	EGSM (nominal)	PCN (nominal)
6	92	83
7	102	93
8	112	103

Troubleshooting

If the calibration does not succeed the software normally reports ”Unable to read data from phone” or ”Failed to set high reference” or ”Failed to set low reference”.

In this case check first the basic functionality of the receiver chain: RF generator frequency set as in the calibration and level for example to the high reference value.

Then go to the RSSI reading menu (under RF controls). If the reading is very low there is something broken in the receiver and must be found by measuring voltages and signal levels at different places (information of these can be found elsewhere in this manual).

If the RSSI reading seems to be within 5 - 10 dB the same as the RF input level check that the VCTCXO frequency is close enough the wanted frequency. This is most easiest done by measuring VCO frequency in GSM middle channel 60 (VCO frequency is be 3788 MHz). If the deviation is bigger than about +/–50 kHz it is probable that the VCTCXO is not operating correctly.

If both of these (RSSI reading and the frequency) seem to be correct and calibration still fails the most probable reason is that there must be some missing gain step in Hagar or then the problem must be in Coppa.

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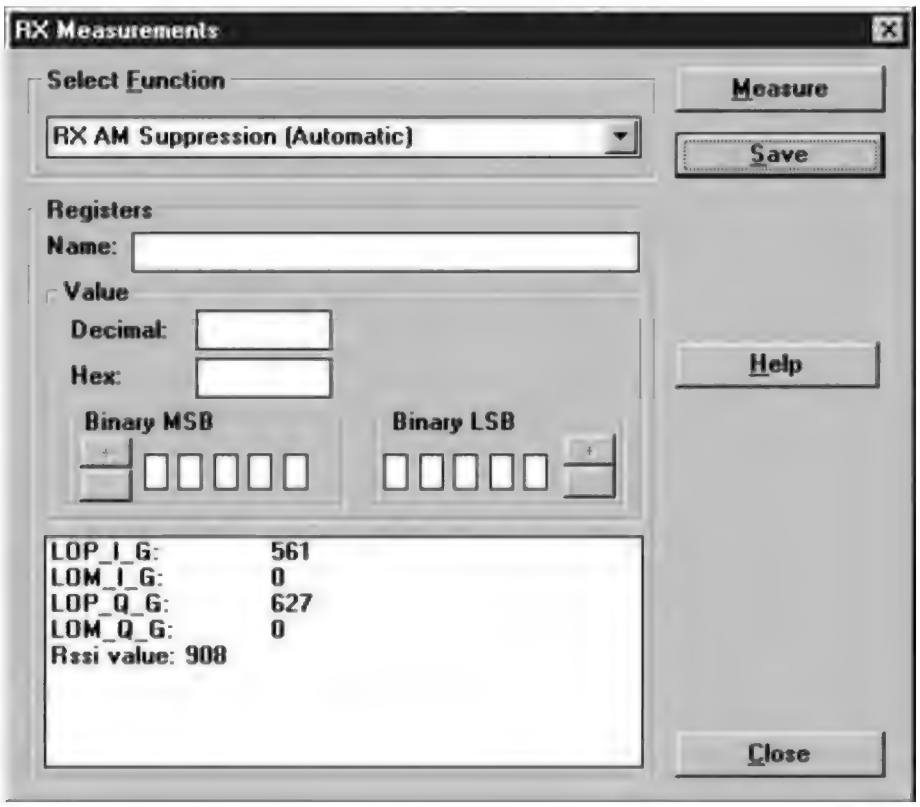
3. AM suppression tuning

This operation is recommended when RX components have been changed (between N505/Hagar and Z670/antenna switch).

AM suppression calibration is for tuning four Hagar parameters to get as small RSSI value as possible.

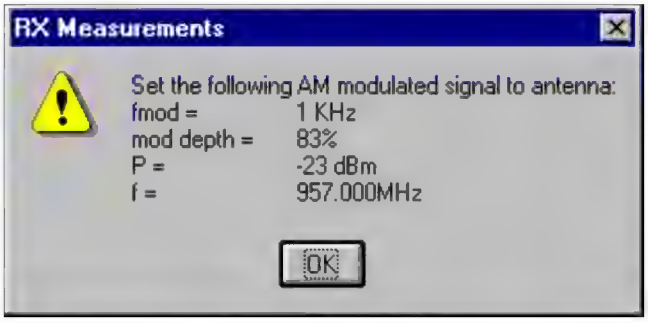
For AM–suppression calibration external signal generator with AM–modulation is needed.

Select *Am Suppression...* from *Tuning* menu.



Signal generator setup:
AM–modulation, fmod = 1 kHz, mod. depth = 83%
f = ch(default)+10 MHz,
P = –23 dBm (EGSM)
P = –26 dBm (PCN)

Press *Measure* button.



Press *OK* button.

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Test limits for AM–calibr. results:
–86 dBm (EGSM)
–95 dBm (PCN)

Press *Save* button to save the values.

NOTE: AM suppression calibration is needed for the PCN band as well. To change the band go to *Product Menu* and select *Band*, *PCN.*

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4. Alignment of Transmitter Power Levels

Equipment:

Pulsed power meter or spectrum analyzer and 10 dB attenuator. Voltage source set to 3.6 V.

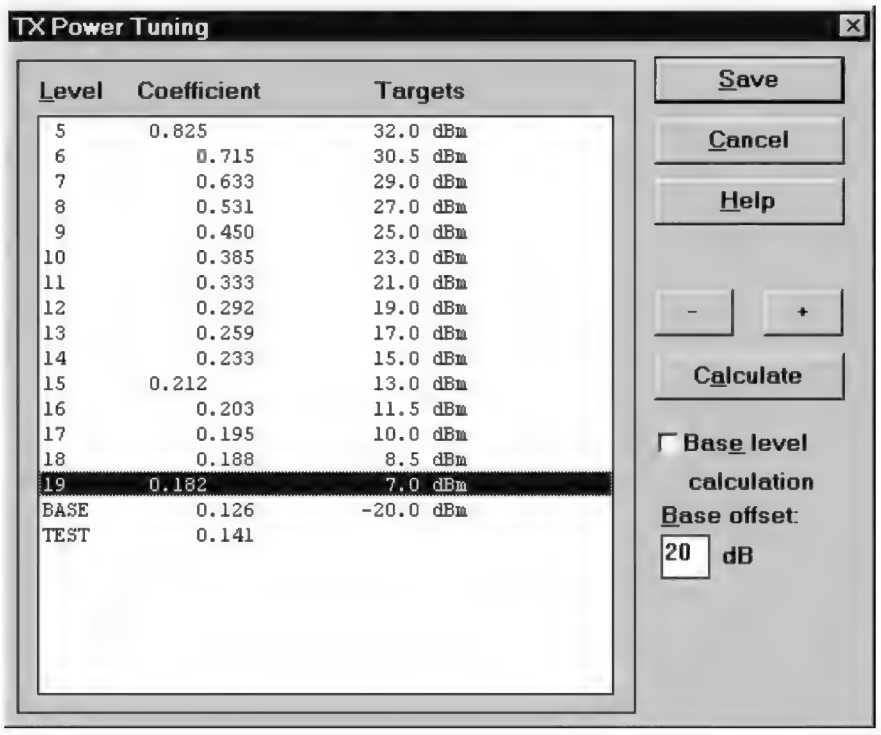
The following **settings** for the spectrum analyzer are recommended when aligning the power levels: zero span, resolution and video bandwidths 1 MHz, input attenuation 40 dB, sweep time 1 ms, video triggering.

NOTE! If spectrum analyzer is used in power level alignment the reading needs to be calibrated with a power meter after every power up. Check also the source voltage during TX burst with oscilloscope and use big enough capacitor.

Procedure:

NOTE: Make sure you are working with GSM900 band. First tune power levels 5, 15 and 19. Then Calculate the other levels and save the values. After this switch to PCN band and do the tuning to levels 0, 11 and 15. (To change the band go to *Product Menu* and select *Band*, *PCN).* Then Calculate the other levels and save the values.

GSM900 TX Power Tuning dialog:



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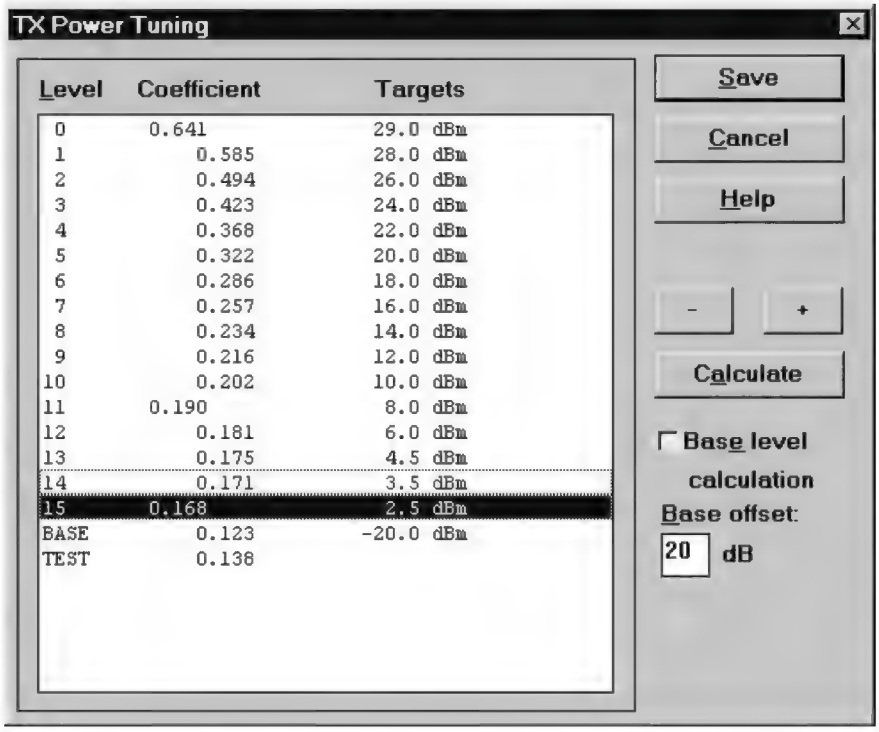
GSM1800 TX Power Tuning dialog:



It is recommended that all the power levels are separately aligned although there is a possibility to align only three and calculate the rest. This is due to the calculation method.

NOTE! Base level **must** be adjusted manually!

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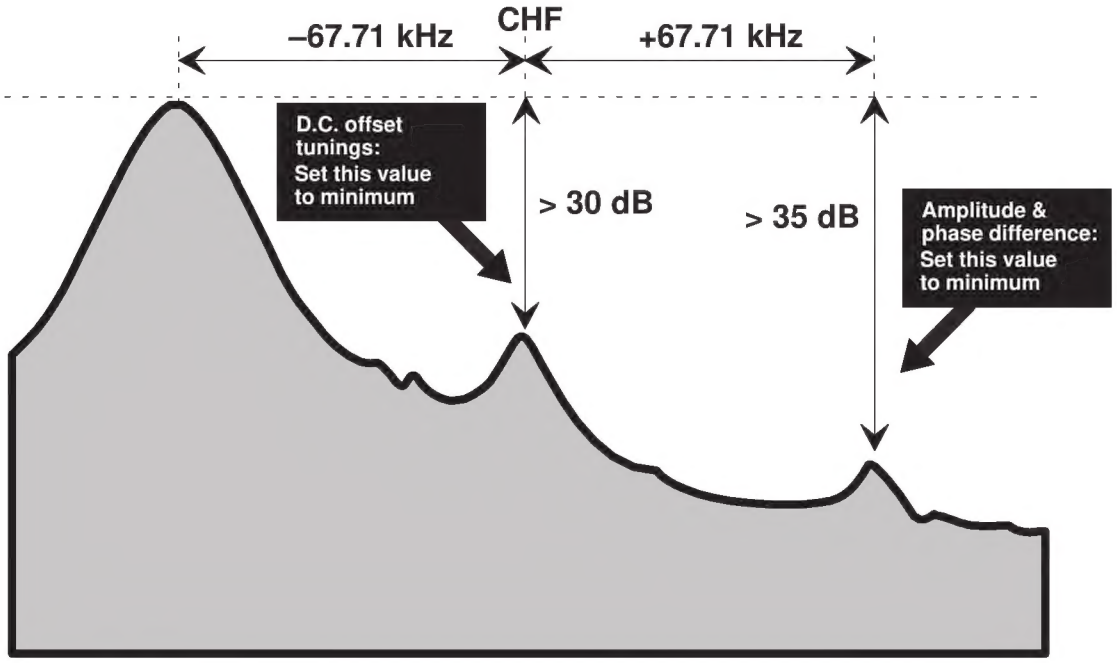
5. I/Q Modulator Alignments

I/Q modulator alignments has to performed in both bands. See chapter "Service Software Instructions" and section "TX I/Q... command" for further information.


–67.71 kHz
CHF
+67.71 kHz
D.C. offset tunings: Set this value to minimum
> 30 dB
> 35 dB
Amplitude & phase difference: Set this value to minimum

Procedure:

Connect the spectrum analyzer to the phone antenna connector. The recommended spectrum analyzer settings are: span 200 kHz, resolution BW 10 kHz, video BW 1 kHz, sweep 500 ms, input attenuation 30 dB.

- From *RF controls* menu make sure that TX data type is 1.
- Go to *TX I/Q tuning* menu. The alignment channel for EGSM is 60 (902 MHz) and for PCN is 700 (1747.8 MHz).
- Select the "TX I DC offset" option and adjust the level of the centre frequency (CHF) to minimum.
- Select the "TX Q DC offset" option and adjust the level of the CHF again to minimum.
- After finding both minima change "TX I DC offset" by step or two from the current value to both directions to see, whether better minimum can be found for CHF.
- Select the "Amplitude Difference" option and adjust the level of the unwanted sideband CHF + 67.71 kHz to minimum.
- Select the "Phase Difference" option and dajust the level of CHF + 67.71 kHz again to minimum.
- After all the minima have been found press "Save" button to store the values to phone EEPROM.

Targets:

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The level of the centre frequency CHF should be at least **30 dB** down to the wanted sideband CHF - 67.71 kHz.

The level of the unwanted sideband CHF + 67.71 kHz should be at least **35 dB** down to the wanted sideband CHF - 67.71 kHz.

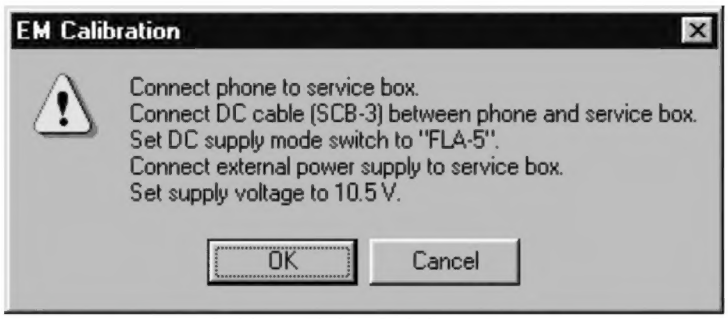
6. Energy Management Calibration

See section "Tuning – Energy Management Calibration... command" for further information.

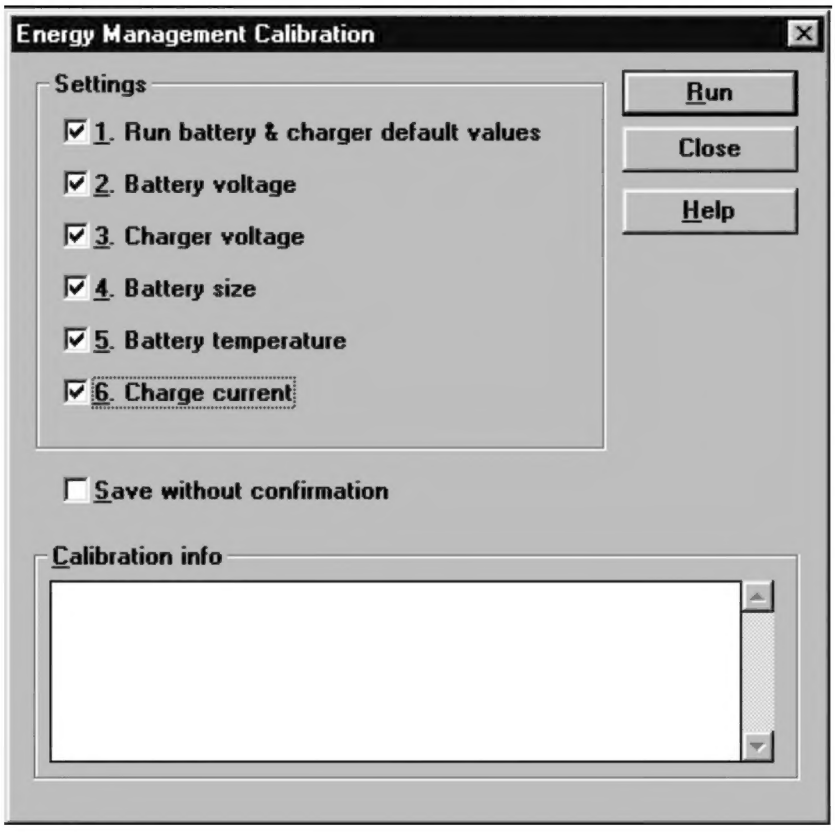
NOTE: This Calibration must be done when N100, N101 or a discrete component affecting these two is changed.

Before battery a/d tuning is started a voltage setting request is shown to user (Set supply voltage to 10,5 V). Service Battery is in this case JBU–6.

NOTE: Set DC Supply Mode in JBU–6 in FLA–5 (FLA–5/7) position! Remember to connect SCB–3 cable between Service Box JBU–6!


EM Calibration
Connect phone to service box.
Connect DC cable (SCB-3) between phone and service box.
Set DC supply mode switch to "FLA-5".
Connect external power supply to service box.
Set supply voltage to 10.5 V.
OK
Cancel

When external power is connected and user selects Yes to continue, the application displays the **Energy Management Calibration** dialog box:



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Appendix 1, Vocabulary

Abreviation	Description
ASIC	Custom circuit which for instance controls communication between MCU and DSP
JBU–6	Service box
CLF	Common Look and Feel
CLI	Calling Line Identification
COBBA	Common Base Band Analog
DATA	DATA interface module
DAU–9S/P	MBUS/FBUS cable
DLL	Dynamic Link Library
DSP	Digital Signal Processor which controls radio interface and speech coding/decoding
EEPROM	Memory for adjustment parameters (Electrically Erasable and Programmable Read Only Memory)
FBUS	Fast serial bus
IMEI	International Mobile Equipment Identification code
IR	Infra Red transmitter
M2BUS	Serial communication bus which can be connected to accessory devices and test PC
MCU	Master Control Unit processor
MDI	MCU DSP Interface; message interface via ASIC registers
ME	Mobile Equipment
MODAL (dialog box)	A modal dialog box requires the user to complete interaction within a dialog box, and close it before continuing with any further interaction outside the window.
MODELESS (dialog Box)	A modeless dialog box allows the user to interact with other windows and applications.
MS	Mobile Station

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PC	IBM PS/AT or compatible personal computer
PCI	Phone Controlling Interface SW for PC
PKD–1/1NS/1CS	Hardware protection key (DESKEY DK2) for protecting service software from illegal copying. The software will not work without this key !
RF	Radio Frequency parts
RTC	Real Time Clock
SW	Software
TDF–4	Flash security box
UI	User Interface

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